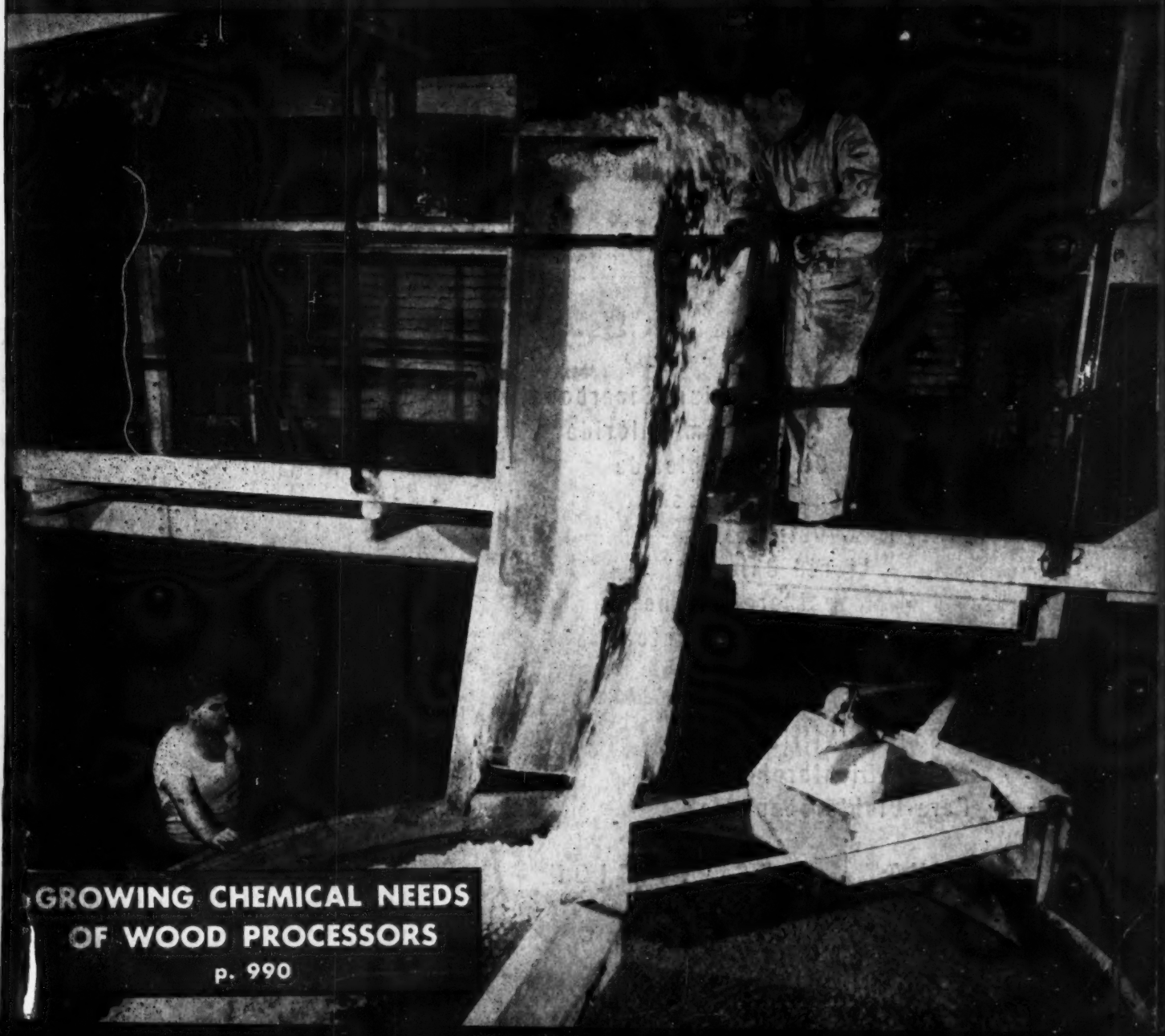
ber 1947

Chemical Industries

IN THIS ISSUE

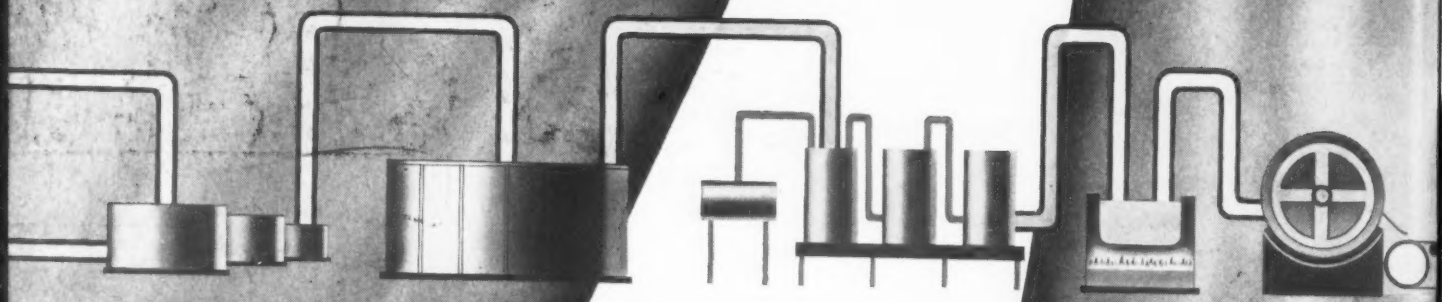
This Issue in Two Parts. Part 1:
Chemical Needs of Dry Cleaning Industry . . . 982
Better Lab Layout Boosts Research Output 986
Drilling Muds Pose Chemical Problems . . 988
Western Pulp and Paper Industry 990
Surface-active Agents in Fire Control 994
How to Price New Products 996
Duct Insulation Cuts Operating Costs 999



GROWING CHEMICAL NEEDS OF WOOD PROCESSORS

p. 990

THE TRADEMARK THAT IDENTIFIES THE FINEST



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Caustic Soda
Liquid Chlorine
Monochlorobenzene
Potassium Carbonate
Soda Ash
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Sodium Nitrite
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ACID SILICIC Fluorescent Grade
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CARBON DISULFIDE, Technical
CARBON TETRACHLORIDE, C.P.
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CHLOROFORM TECH.
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COBALT NITRATE, Technical Crystals
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SODIUM HYDROXIDE, U.S.P., Sticks
SODIUM IODIDE, U.S.P.
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SODIUM OXALATE, Technical Powder
SODIUM SULFIDE, Purified Crystal
SODIUM THIOCYANATE, N.F., Crystals
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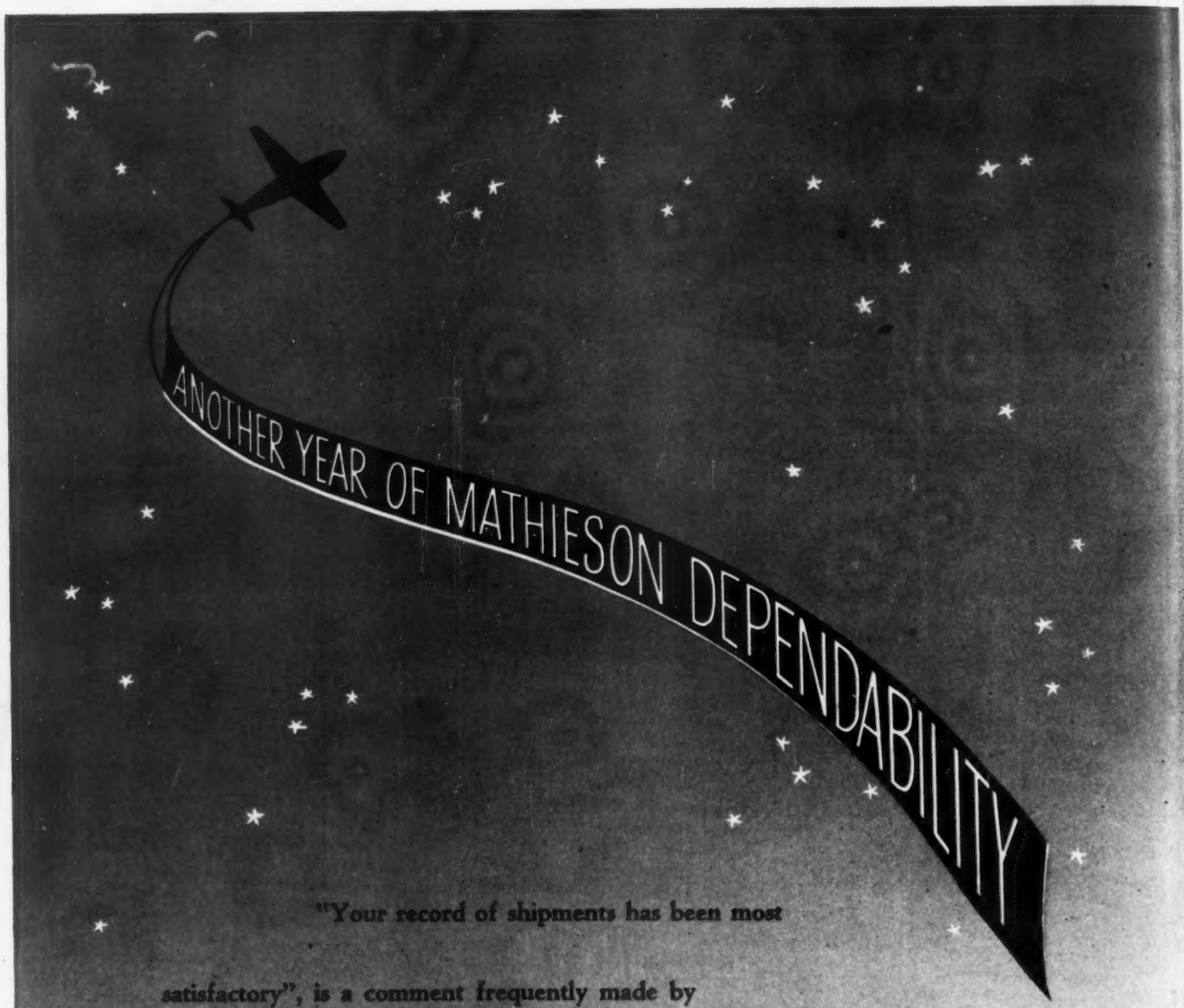

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Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Chlorine Dioxide . . . Ammonia, Anhydrous & Aqua . . . HTH Products . . . Fused Alkali Products . . . Dry Ice . . . Carbonic Gas . . . Sodium Chlorite Products . . . Sodium Methylate.

Chemical Industries

"SERVING THE CHEMICAL PROCESS INDUSTRIES"

VOLUME 61—NUMBER 6 **DECEMBER, 1947**

What's new 973-981

Maleic Outlook
Hydroabietyl Alcohol
Low Pressure Aerosols
Long-Lasting Insecticide
Acetaldehyde Disulfonic Acid
Beta-Propiolactone
Lithium Aluminum Hydride
Non-Spalling Refractory
New Corn Starch Process
Acetylated Wood
Promising Antibiotic
Cartesian Manostat
Synthetic Liquid Fuels
Super Bug Killer

Newsletter 967

Editorial 971

The Dry Cleaning Industry Requires New Chemicals ..... *by Leroy H. Mantell* .. 982

Better Lab Layout, Higher Research Output ..... *by E. G. Rochow* 986

Drilling Muds Pose Chemical Problems ..... *by W. T. Cardwell* 988

Wood, Paper and Pulp: Important Factors in Western Industrial Growth 990

"Wetter Water" Pares Fire Losses ..... *by H. W. Zussman* 994

Now to Utilize Market Research Data in New Product Pricing ..... *by Roger Williams, Jr.* 996

Plant Operating Costs Cut by Mineral Tool Insulation of Ducts 999

DEPARTMENTS

Reader Writes 936
New Products and Processes 1006
New Equipment 1020
Packaging and Shipping 1038
Patents and Trademarks 1093
Plant Notebook 1048
Laboratory Notebook 1052
Industry's Bookshelf 1056
Booklets and Catalogs 1060
We—Editorially Speaking 1090

NEWS OF THE MONTH

Chemical News in Pictures 1001
General News 1065
Canadian News 1068
Chemical Specialties News 1072
Chemical Markets 1076
Chemical Economics & Statistics 1077
Current Prices 1078
Index to Advertisers 1088

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THE READER WRITES

Shrink-Proofing Process Challenged

To the Editor of Chemical Industries:

On the morning of November 17, 1947, there was filed in the U. S. Court of Claims a petition (Leighton B. Smith and Charles E. Ruby vs. The United States) whereof a copy accompanies this letter.

By referring to page eight of this petition, you will find that we are asking for six million dollars—a not unreasonable sum in view of the facts set forth on that page. Dr. Smith and I are decidedly irritated by the bland effrontery of Lt. Col. S. J. Kennedy at the hearing of the Senate Committee On Wool in making the claim that the Office of the Quartermaster General of the United States had promoted the invention and the development of a chemical process for rendering wool shrink resistant which was invented by us in 1924 and which has received extensive commercial use long prior to 1940.

Dr. Smith and I are Ph.D.'s of the Massachusetts Institute of Technology. He is presently acting as research chemist for the Lever Bros. Co. and I am a consulting chemist and patent attorney. Details of our careers appear in American Men of Science.

This information is being sent to you in the interests of accuracy.

CHARLES E. RUBY
38 Westmoreland Ave.
Boston, Mass.

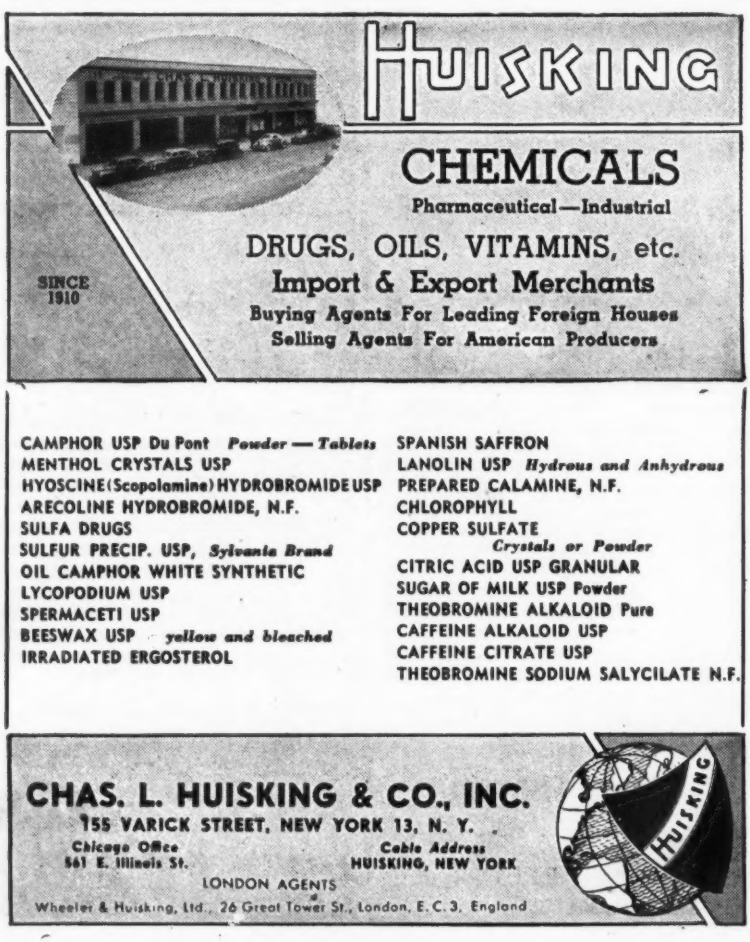
Meaning of "Commercial Quantities"

To the Editor of Chemical Industries:

It has been brought to our attention that the term "available in commercial quantities," as used in our listings in "New Chemicals for Industry" in your September issue, has led to misinterpretations by some readers.

We use this term to imply that we can supply a chemical in any desired quantity, but do not believe that it is the equivalent of a price quotation. Our price list and quotations on all of our products are furnished promptly upon request.

BIOS LABORATORIES
New York 18, N. Y.



Changes Detergent Name

To the Editor of Chemical Industries:

In your October issue you mentioned that Up-State Chemical Co. is marketing an amine condensation detergent under the tradename KF-100. This name also appeared in the list of synthetic detergents accompanying the article by J. W. McCutcheon in your November issue.

This information was correct at the time. We wish to advise you, however, that the name of this product has been changed to K-100.

C. D. QUIMBY
Up-State Chemical Co., Inc.
Newark, N. J.

Vinyl Resin Background

To the Editor of Chemical Industries:

We have been informed that some of the claims made recently by this company in its news releases concerning our new Geon paste resins have been questioned. We regret that any cause for controversy has arisen, and we would like to take this means of clearing up any misunderstanding which might still be clouding the issue.

We have no wish to detract from the early work in this country by others, in which vinyl copolymer resins were used both as "plastisols" and as "organosols." With these previously announced materials, none of which were true polyvinyl chloride, it was possible to make resin-plasticizer pastes without diluent ("plastisols") or resin-plasticizer-diluent combinations ("organosols"). The resin-plasticizer pastes, however, when made fluid enough to process easily, yielded soft, almost jelly-like, compositions with valuable, but limited, end uses. One of the first and most valuable uses for this type of plastisol was as a filler in the interstices of heavy electrical cable.

Resin-plasticizer-diluent systems, while applicable to a wider variety of uses, particularly in the coating field, have the obvious disadvantages of flammability and toxic hazards, solvent recovery (or disposal) and shrinkage of the deposit.

It remained for the B. F. Goodrich Chemical Co. to develop commercially for the first time in this country, resins of straight polyvinyl chloride which would readily yield pastes without diluent, fluid enough for easy processing but of proper hardness and other properties after fusion to be useful in the broad fields of dipping, coating, extruding and cast molding. This achievement represents, in our opinion, a real contribution to vinyl resin technology, and is so acknowledged by the industry.

We hope that this information, brief as it is, will be helpful in settling the controversy.

J. R. HOOVER, Vice President
B. F. Goodrich Chemical Co.
Cleveland, Ohio

A LAMB'S TALE

When you pay the bill for your wife's, or daughter's, new mouton coat we'll hardly expect you to think of Chromium Chemicals. But, later, when you notice how it wears—how the rich brown color remains unfaded—then you may recall that Chromium Salts had a hand in tanning the lambskins, and dyeing the fur.

Many varied and useful properties of Chromium Chemicals have been known for years, but new applications are constantly being developed to take advantage of those properties, mouton being an example of such an application.

Mutual is constantly alert to, and interested in, new uses for Chromium Chemicals, even though at the present time we are finding it a formidable task to merely take care of the requirements of our old customers.

Bichromate of Soda · Neutral Chromate of Soda
Bichromate of Potash · Chromate of Potash
Chromic Acid

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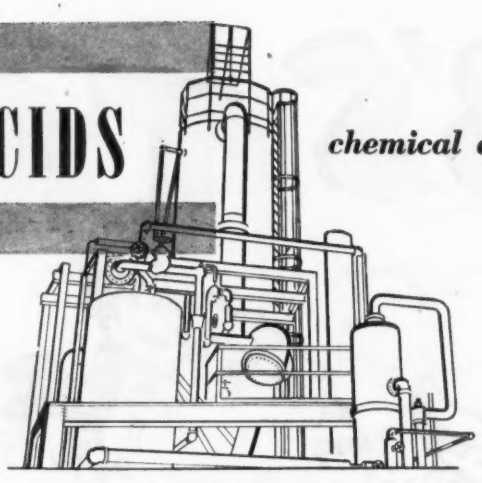
CHROMIUM CHEMICALS

FATTY ACIDS

chemical data . . . product data . . . use data



fractional distillation

THE KEY TO IMPROVED PRODUCTS

Formerly the man attempting to improve his products—or to develop new ones—was limited not only by his own ingenuity, but also by the raw materials at his disposal. Today vast new fields are open to the industrial chemist because of Armour's patented fractional distillation process, which separates crude mixed fatty acids into the pure component acids. This remarkable process now makes available to industry fatty acids and fatty acid derivatives—such as amines, amides, nitriles, quaternary ammonium salts—which previously existed only in laboratory quantities.

Just a few of the widely contrasting uses of the versatile "Neo-Fats" (trade name of Armour's fractionally distilled fatty acids) are . . . ore flotation and chewing gum, soaps and rubber tires, typewriter ribbons and varnishes, chemicals and cosmetics, candles and incendiary bombs, recording cylinders and lubricating greases, shoe polishes and insecticides! These uses are just an indication of the Neo-Fats' contribution to industry today. Their variety makes possible entirely new products.

FATTY ACIDS FOR COMPOUNDING RUBBER PRODUCTS

White sidewall stocks require non-discoloring and non-staining agents. This need is filled by Neo-Fat 1-60, which is more completely saturated than commercial double-pressed stearic acids. Neo-Fat 1-60 also contains 75% stearic acid in contrast with the 40% content of double-pressed stearic. It is a solid flaked material, easy to incorporate in open mill or Banbury mixing. Furthermore, Neo-Fat 1-60 gives faster cures with better physical and aging characteristics.

Other Neo-Fats widely used as activators, emulsifiers, mold lubricants, etc., include: Neo-Fat 1-65, HFO, D.D. Cottonseed and D.D. Animal Fatty Acids.

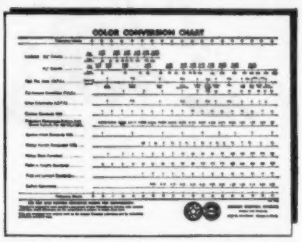
EXPERTS DISAGREE ON BEST FATTY ACIDS FOR GREASES

Many grease compounders insist that Double Distilled Animal Fatty Acids are best for use in soft greases. Others favor D. D. Cottonseed or Corn Oil Acids.

Armour offers both types, as well as Lub-Base, a special blended and stabilized fatty acid developed especially for greases. Lub-base produces greases which by actual test are more stable to oxidation and discoloration.

For hard greases, Neo-Fats 1-54, 1-56, 1-60, 1-65, and HFO are recommended.

FREE COLOR CONVERSION CHART



You can obtain Armour's 8½" x 11" color conversion chart simply by mailing in the coupon below. This chart, printed on sturdy cardboard, covers the complete commonly-used color density range. It's a valuable, time-saving reference for laboratory, technical, production and purchasing personnel.

MODERN SOAP-MAKING PRACTICE STRONGLY FAVORS FATTY ACIDS

Soap and Sanitary Chemicals, leading publication of the soap industry, recently editorialized on the advantages of fatty acids over whole fats in the manufacture of soaps:

"Out of the complexities of progress in fat chemistry, a definite trend appears to be shaping up which a decade hence may mean a greatly changed soap industry. We feel that the handwriting is on the wall and the day is not too far distant when natural glycerides will no longer find their way to the soap kettle as such. Recent developments in fatty acid manufacture, fat splitting and fractionation at lower and ever lower costs, point to these materials as the future starting point in all soap manufacture. Except in the case of the largest soapers, whole oils and fats will not be processed by the soap manufacturer. Fatty acids to meet individual requirements for different types of soaps, always uniform, and lacking the drawbacks of natural glycerides, will comprise the basic raw material for the average soap kettle . . . ."

Armour produces 15 fatty acids particularly suited to soap manufacture including:

	Titer	*Acid V.*	*Iodine V.*	*Color*
D.D. Soybean	24°C	198	135	5 FAC
D.D. Corn Oil	30°C	199	110	5 FAC
D.D. Cottonseed	37°C	200	105	5 FAC
Neo-Fat 3	23°C	198	120	7 FAC
Neo-Fat S-142	17°C	190	130	5 FAC

PRODUCT SPECIFICATIONS

Neo-Fat 7 (90% Caprylic Acid) Melting Point, 13° C; Iodine Value (Wijs), 0.8; Acid Value, 385.

Uses: Essences, synthetic perfumes, plasticizers, pharmaceuticals, chemical intermediates.

Neo-Fat 15 (90% Capric Acid) Melting Point, 30.0° C; Iodine Value, 1.2; Acid Value, 324.

Uses: Flavors, essences, germicides, anti-foaming agents, dyestuffs, chemical intermediates.

Neo-Fat 11 (90% Lauric Acid) Melting Point, 38.0°C; Iodine Value, 1.0; Acid Value, 276.

Uses: Detergents, metallic soaps, shampoos, shave creams, alkyd resins, chemical intermediates.

Double Distilled Coconut Fatty Acids: Mixed coconut fatty acids stripped free of the short-chain acids (caproic, caprylic, capric).

Uses: Soaps, shampoos, emulsions, alkyds, plasticizers.

LAURIC ACID SUPERIOR FOR HIGH BAKE ENAMELS

White baking enamels formulated from a melamine alkyd combination have materially better color stability at high temperature schedules when the alkyd is formulated from Neo-Fat 11 (Lauric Acid).

It has been well-established that a chain length of 12 carbons (lauric acid) is the optimum length for producing plasticizing alkyds for high temperature bakes. Neo-Fat 11 with its very high lauric acid content has almost complete freedom from unsaturated compounds and is ideal for high bake enamels.

SEND FOR "THE CHEMISTRY OF FATTY ACIDS"

This 12-page Armour booklet furnishes basic information on the fatty acids and their derivatives in concise and readable form. Available upon request—without charge. Mail in coupon below.

Individual data sheets are available on each of the fatty acid products mentioned on this page. Indicate on coupon below any particular sheets you would like to have.

Mail this coupon today!

(*Attach to your business letterhead, please*)

Please send me, without charge, items checked below.

- ☐ Color Chart
- ☐ Booklet, "The Chemistry of Fatty Acids"
- ☐ Individual Data Sheets on.....

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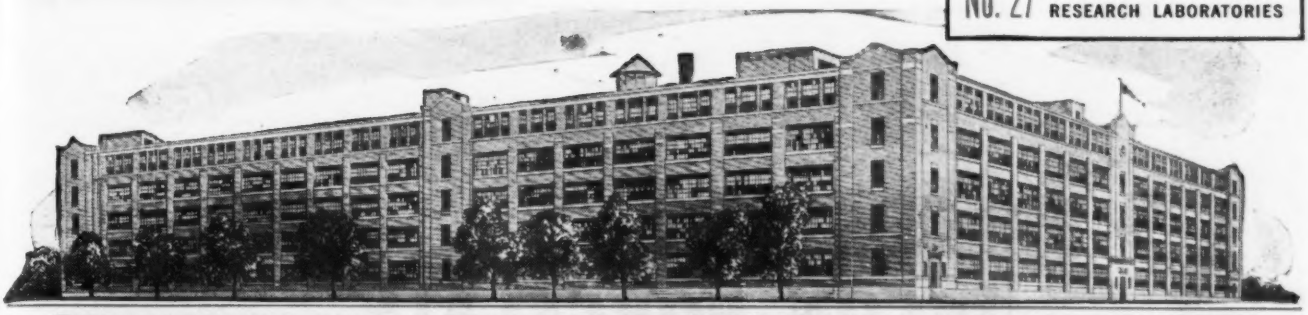

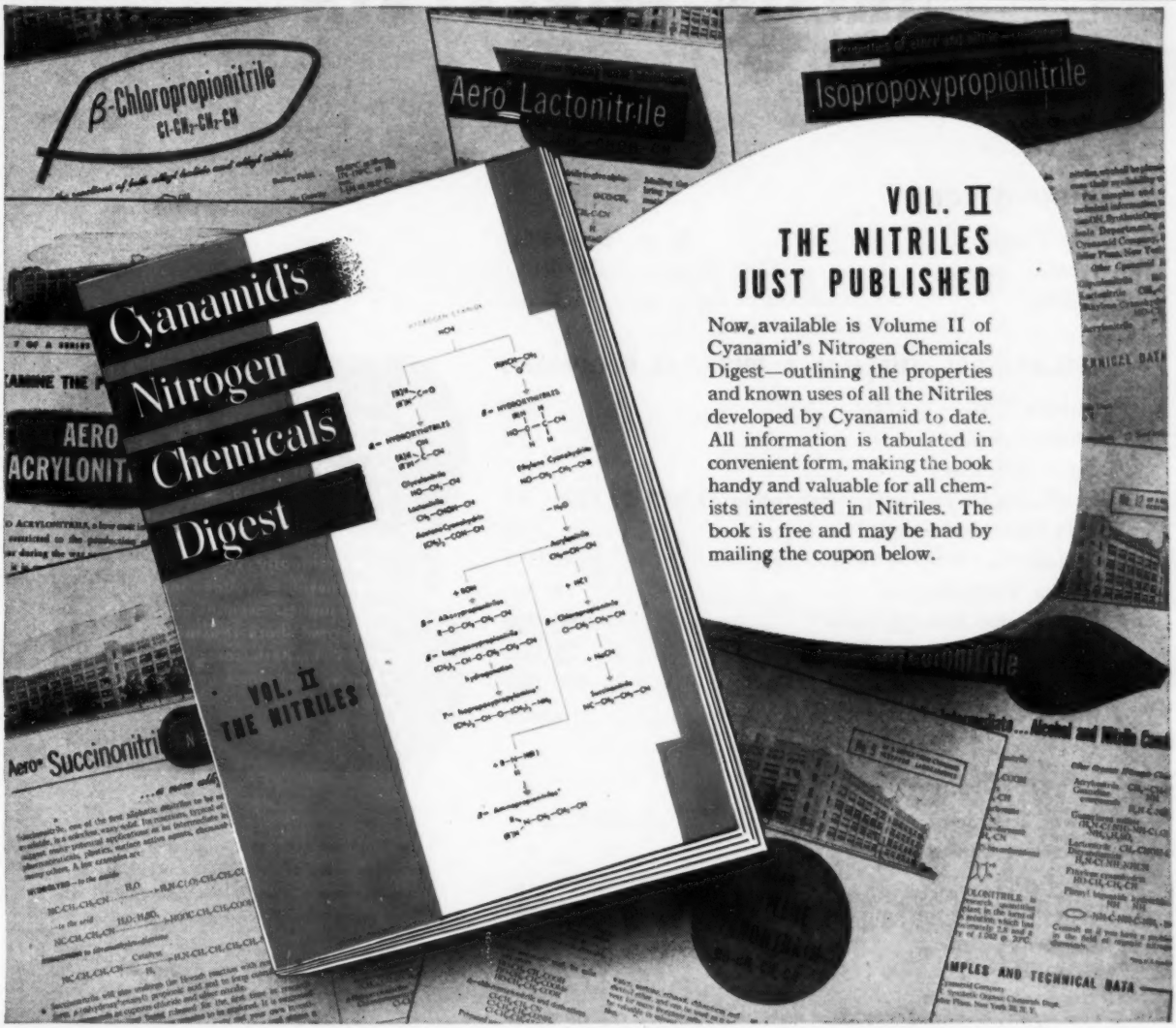

VOL. II
THE NITRILES
JUST PUBLISHED

Now, available is Volume II of Cyanamid's Nitrogen Chemicals Digest—outlining the properties and known uses of all the Nitriles developed by Cyanamid to date. All information is tabulated in convenient form, making the book handy and valuable for all chemists interested in Nitriles. The book is free and may be had by mailing the coupon below.

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*ZIRCON PORCELAIN

COMPOSITION

Non-Plastic	Zircon ($ZrO_2 \cdot SiO_2$)
Plastic	Clay ($Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$)
Fluxing	Compounds of CaO, MgO, BaO, SrO

MECHANICAL, THERMAL & PHYSICAL PROPERTIES

Specific Gravity gm/cc	3.68
Absorption %	0.0
Mohs' Hardness	8.0
Coefficient Linear Thermal Expansion 20-700° C x 10-6	4.9
Safe Operation Temp. °C	1050
Thermal Conductivity cal/cm²/cm/sec/°C	0.0117
Tensile Strength #/in²	12 700
Compressive Strength #/in²	90 000
Transverse Strength #/in²	25 000
Modulus of Elasticity #/in²	24 000 000
Thermal Shock Resistance	Good

ELECTRICAL PROPERTIES

Power* Factor at 1 Megacycle	0.0010-0.0014
Dielectric Constant	9.2
Loss Factor	0.009-0.013
Dielectric Strength Volts/mil.	290
Resistivity Ohm-cm	10^{13}
Te Value	700

*Power factor and Dissipation Factor are synonymous for values in the range cited in this report.

ZIRCON PORCELAIN has primary usage in applications requiring a material of low electrical losses. Radio, radar and miscellaneous high frequency equipment are specific examples. Zircon Porcelain is also ideally suited for low-frequency, high voltage insulation where highest mechanical strength or thermal shock resistance is required. In both cases, it proves effective at normal and elevated temperatures.

* *The Titanium Alloy Manufacturing Company are producers of the zircon and double zirconium silicates used in the manufacture of these porcelains. For samples, see your porcelain supplier.*

TAM

TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York City *General Offices and Works:* Niagara Falls, N. Y.

Synthetic DETERGENTS

FOR ALL INDUSTRIES

ULTRA Chemical WORKS

ULTRAPONE-S

This is a new, slightly alkaline organic surface active agent, which lends itself to a multitude of applications in textile and cosmetic trades as well as for household cleaning detergents.

PROPERTIES:

- 100% active
- Clear, soluble in water in all proportions
- Active in extremely low concentrations
- Forms Viscous solution in dilutions as low as 10%
- Compatible with soap, most sulphated oils, sulphated or sulphonated synthetic detergents
- Non irritating
- Rich foaming
- Has excellent dispersing qualities
- Acid, alkali and lime stable
- pH 8.8
- Emolient
- Has excellent detergency

SPRAY DRYING

Our extensive spray-drying facilities enable us to custom-spray dry detergents ranging from 10% to 60% organic actives. Choose the types most useful to your operation.

Our wide range of detergents are available in consumer form: household detergents, rug shampoo, bubble bath, powder shampoo, and car wash.

Complete packaging facilities for private brand products are also available.

SULFRAMIN DT POWDER OR PASTE

The low-priced versatile detergent.

PROPERTIES:

- Alkyl amido alcohol sulphate
- High resistance to hard water
- Unaffected by alkali, acids, or lime
- Freely soluble
- Forms no precipitate
- Produces rich liquors in dilutions as high as 1 to 10,000

OTHER ULTRA DETERGENTS

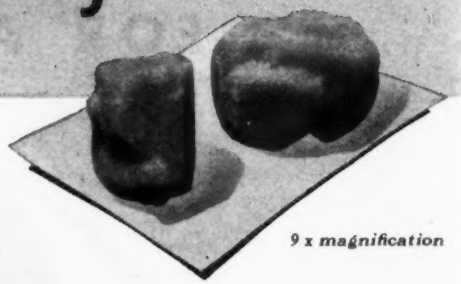
- **Sulframin L W (Powder)**
- **Sulframin A B W (Powder)**
- **Sulframin DH (Paste)**
- **Sulframin D R (Liquid)**
- **Sulframin D R B (Liquid)**
- **Sulframin N (Paste)**
- **Ultrapone L R (non-ionic)**

ULTRA CHEMICAL WORKS, Inc.

PATERSON, NEW JERSEY — CHICAGO, ILLINOIS

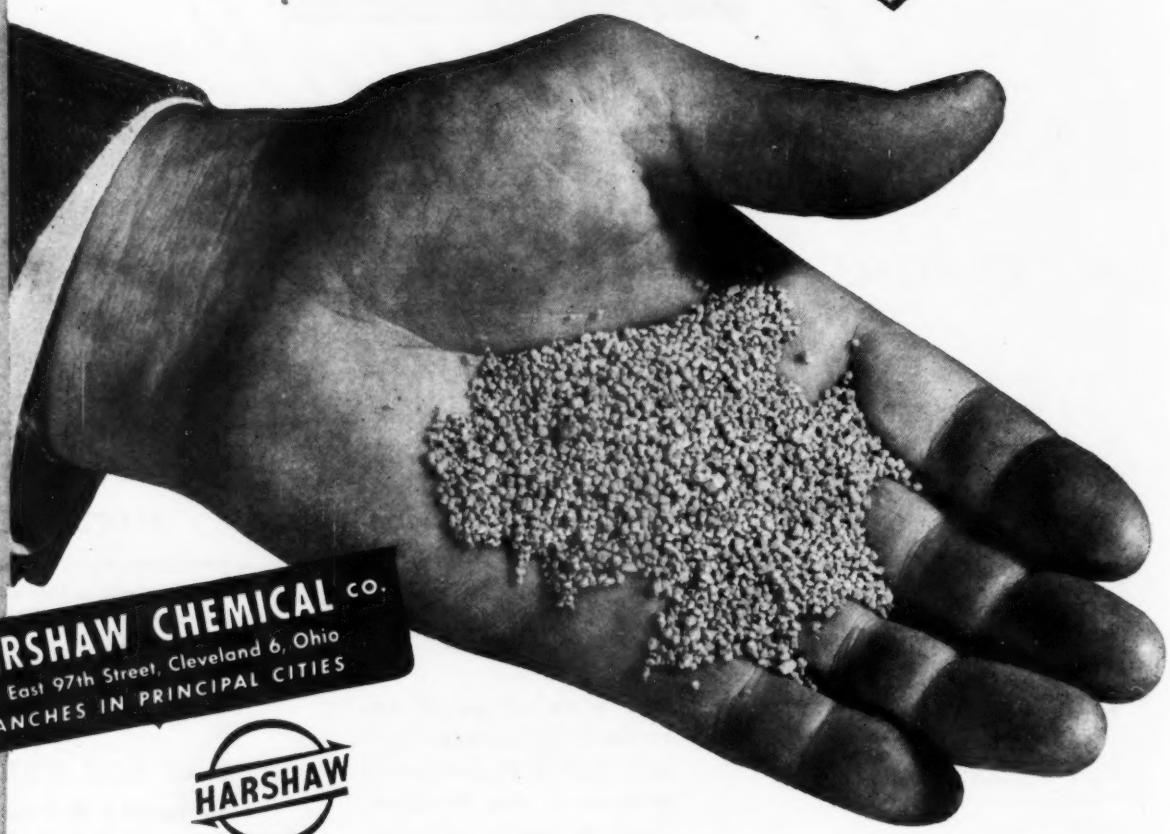
IN CANADA: Delta Chemical Works Corp., Brantford, Ontario • IN MEXICO: Icon, S. A., Mexico, D. F.

NEW Cobalt Sulphate Crystals



9 x magnification

UNIFORMLY SMALL



THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

HARSHAW

Harshaw is now producing improved quality, technical grade cobalt sulfate crystals (21% Co) of regular octahedral shape. These new uniformly small crystals are far superior to the old large type crystals. They flow freely and dissolve rapidly. Harshaw Cobalt Sulfate Crystals are packed in 100 pound laminated waterproof bags for easy handling and storing. Send your order to the nearest Harshaw Branch — take advantage of this newest Harshaw development.

HERCULES

CMC

(SODIUM CARBOXYMETHYLCELLULOSE)

NEW CELLULOSE GUM HAS PROPERTIES THAT SUGGEST 1001 USES

Hercules ® CMC offers you the many advantages of water-soluble starches, gelatins, and gums—plus the additional qualities found in processed or synthesized hydrophillic colloids.

Hercules CMC is the sodium salt of carboxymethylcellulose. In application it is a water-soluble cellulose gum. Its ability to increase and control the viscosity of water has resulted in several applications. For example, in textile manufacture it is used in sizes and finishes, as well as for printing pastes, where it is added to the color box.

Hercules CMC is also used in ointment bases, in the thickening of rubber latex, in can-sealing compounds, and for grease-proof coatings for heavy-stock papers and paperboards. As an emulsion stabilizing or suspending agent, it assists in the manufacture and improves the service use of lotions and other cosmetics, toothpaste, and many types of oil-in-water emulsions. Other products in which its properties have been found useful, include: emulsion paints and lacquers, special-purpose adhesives, ceramics, and colored lead pencils.

This economical cellulose gum—now lower in price than ever before—is furnished in low, medium, and high viscosity types. For samples and technical data, return coupon below.

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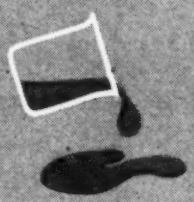
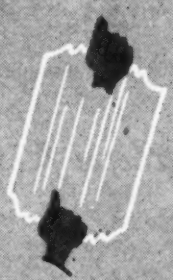
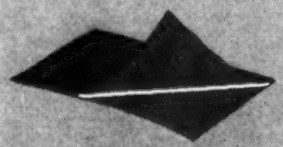


INCREASES, CONTROLS VISCOSITY OF WATER

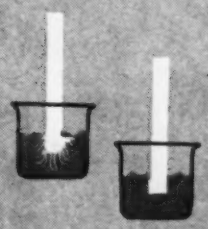


FORMS TOUGH FILMS

STABILIZES EMULSIONS

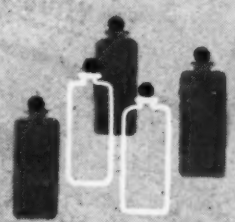


ADHESIVE—BUT NOT STICKY



WATER-SOLUBLE, YET CAN BE MADE INSOLUBLE

READILY COMPATIBLE



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INCORPORATED
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Send me information on CMC and sample of low ☐ medium ☐ high ☐ viscosity type.

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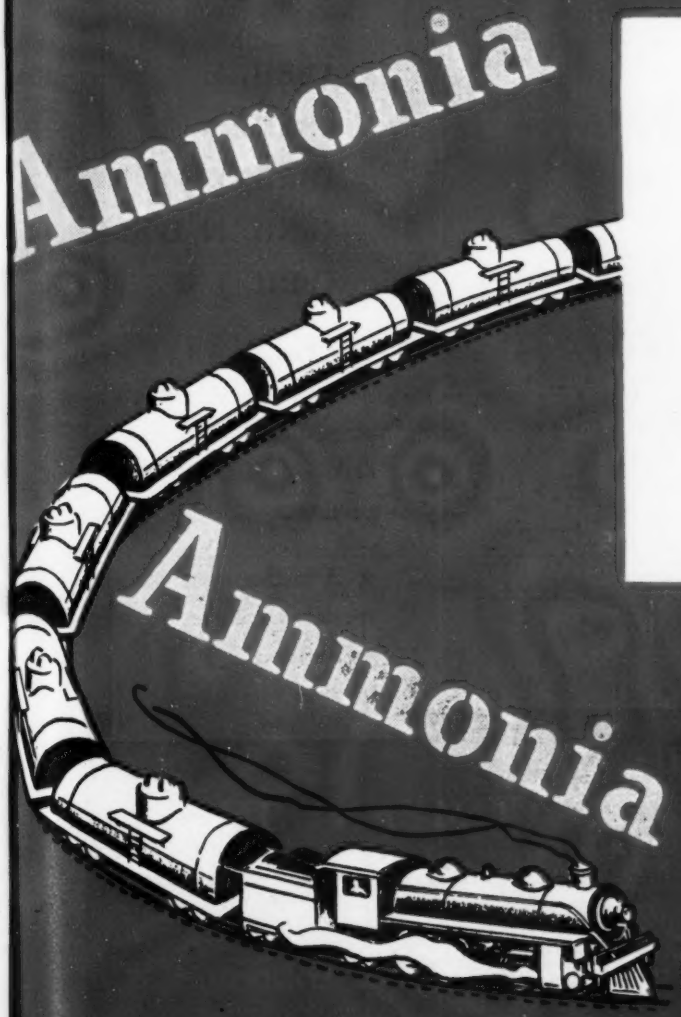

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Commercial grade: 99.5% NH_3; maximum moisture content, .05%. Typical Analysis: 99.95% NH_3; .03% moisture; 2-3 ppm oil.

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26° Baume grade, 29.4% NH_3 content. Color: water white. No H_2S or pyridine content.

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(M.P. 140°C)

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THE *Sharples* SUPER CENTRIFUGE

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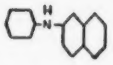
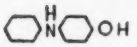
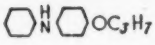
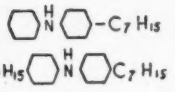
Good-rite
CHEMICALS

Secondary Aromatic Amines


Phenyl B-Naphthylamine


p-Hydroxy Diphenylamine

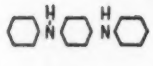

p-Isopropoxy Diphenylamine

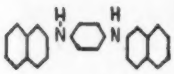

Mixed Mono and Diheptyl Diphenylamines

These amines are suggested for use as stabilizers, anti-oxidants, polymerization inhibitors, and for organic synthesis. It is believed that they will find wide usage in the following industries: Dyes, explosives, plastics, petroleum, photographic, drug, medicinal, and soap.

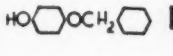
Other organic Chemicals

Di-secondary Aromatic Amines


Diphenyl p-Phenylenediamine

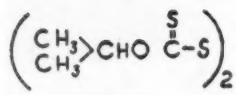

Di B-Naphthyl p-Phenylenediamine

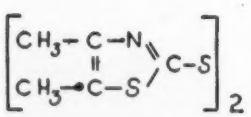
Ethers of Hydroquinone

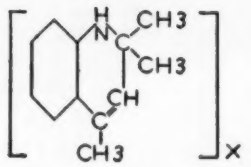

Monobenzyl Ether of Hydroquinone

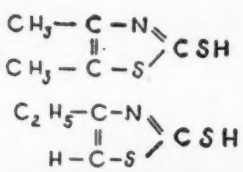
Dibenzyl Ether of Hydroquinone

Miscellaneous


Di-Isopropyl Dixanthogen


Mixed Aliphatic Thiazyl Disulfides


Trimethyl Dihydro Quinoline Polymer


Mixed Ethyl and Dimethyl Mercaptothiazoles

N-Nitroso Diphenylamine

All materials listed here are available in commercial quantities. Prices and technical information are available on request. Please write Dept. CE-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

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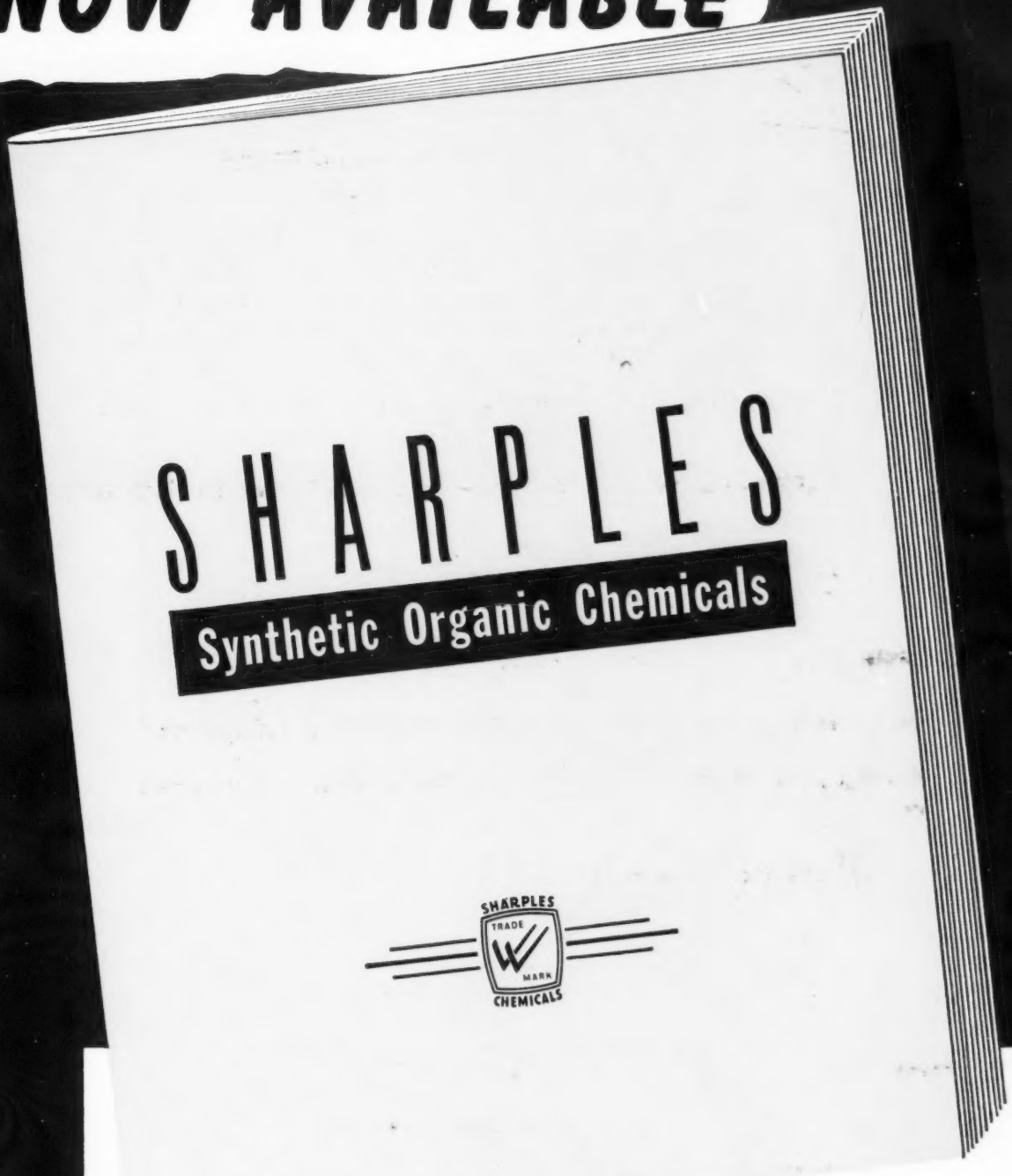

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Alcohols—Alkyl Chlorides—Substituted Amides—Amines
Dithiocarbamic Acid Derivatives—Ethers—Esters—Hydrocarbons
Mercaptans—Organic Sulfides—Phenols—Substituted Ureas

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PENT-ACETATE* (AMYL ACETATE) PENTAPHEN* (p-tert-AMYLPHENOL)
PENTALARM* (AMYL MERCAPTAN) VULTACS* (ALKYL PHENOL SULFIDES)
PENTALENES* (AMYL NAPHTHALENES)

AMYLAMINE ETHYLAMINE BUTYLAMINE
DIAMYLAMINE DIETHYLAMINE DIBUTYLAMINE
TRIAMYLAMINE TRIETHYLAMINE TRIBUTYLAMINE
DIETHYLAMINOETHANOL
ETHYLETHANOLAMINES 161
DI-sec-AMYLPHENOL

TETRAETHYLTHIURAM DISULFIDE
TETRAETHYLTHIURAM MONOSULFIDE
TETRAMETHYLTHIURAM DISULFIDE
ZINC DIETHYLDITHIOCARBAMATE
ZINC DIMETHYLDITHIOCARBAMATE
ZINC DIBUTYLDITHIOCARBAMATE
SELENIUM DIETHYLDITHIOCARBAMATE

AMYL CHLORIDES o-tert-AMYLPHENOL o-sec-AMYLPHENOL
DICHLORO PENTANES DI-tert-AMYLPHENOL AMYL SULFIDE
DIAMYLPHENOXYETHANOL

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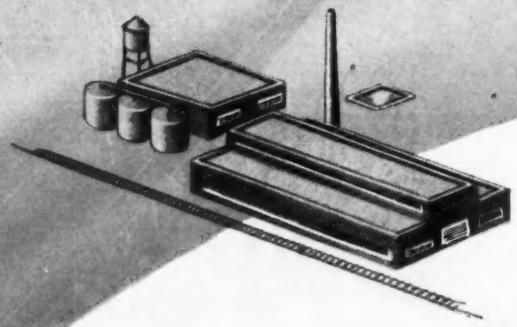

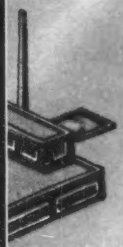

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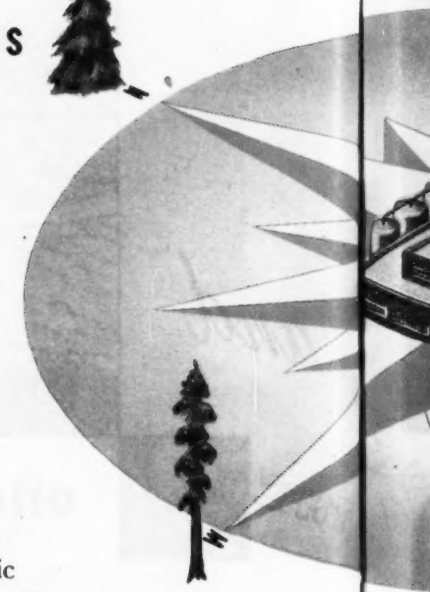
call on GENERAL CHEMICAL first!



At every point of the compass . . . wherever Industry is centered . . . there is a General Chemical producing works or distributing station serving the territory. To supply Industry's requirements across the country, General Chemical has 33 major producing locations from which pour a steady stream of essential chemicals.

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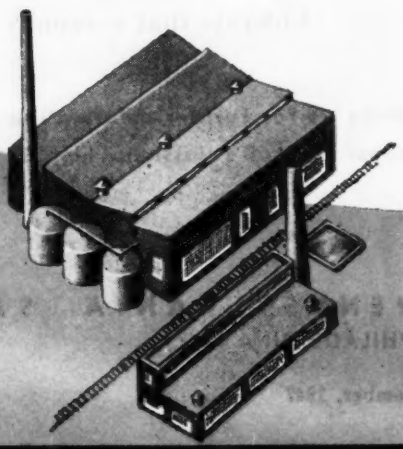

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- Baker & Adamson Works, Marcus Hook, Pa.
- Baltimore Works, Baltimore, Md.
- Baton Rouge Works, Baton Rouge, La.
- Bay Point Works, San Francisco (Port Chicago), Calif.
- Boston Works, Medford, Mass.
- Buffalo Works, Buffalo, N. Y.
- Calumet Works, Chicago (Hegewisch), Ill.
- Camden Works, Camden, N. J.
- Chillicothe Works, Chillicothe, Ohio
- Delaware Works, North Claymont, Del.
- Deming Works, Deming, N. M.
- Denver Works, Denver, Colo.
- Detroit Works, Detroit (River Rouge), Mich.
- East St. Louis Works, East St. Louis, Ill.
- El Segundo Works, Los Angeles (El Segundo), Calif.
- Front Royal Works, Front Royal, Va.
- Hudson River Works, Edgewater, N. J.
- Jacksonville Works, Jacksonville, Fla.
- Johnsonburg Works, Johnsonburg, Pa.
- Kalamazoo Works, Kalamazoo, Mich.
- Menasha Works*, Menasha, Wisc.
- Middletown Works, Middletown, Ohio
- Monroe Works, Monroe, La.
- National Works, Cleveland, Ohio
- Newell Works, Newell, Pa.
- New Orleans Works, Marrero, La.
- Pulaski Foundry, Pulaski, Va.
- Pulaski Works, Pulaski, Va.
- Richmond Works, San Francisco (Richmond), Calif.
- Savannah Works, Savannah, Ga.
- Vancouver Works, Vancouver, Wash.
- Wisconsin Rapids Works*, Wisconsin Rapids, Wisc.

*General Chemical Company, Inc.

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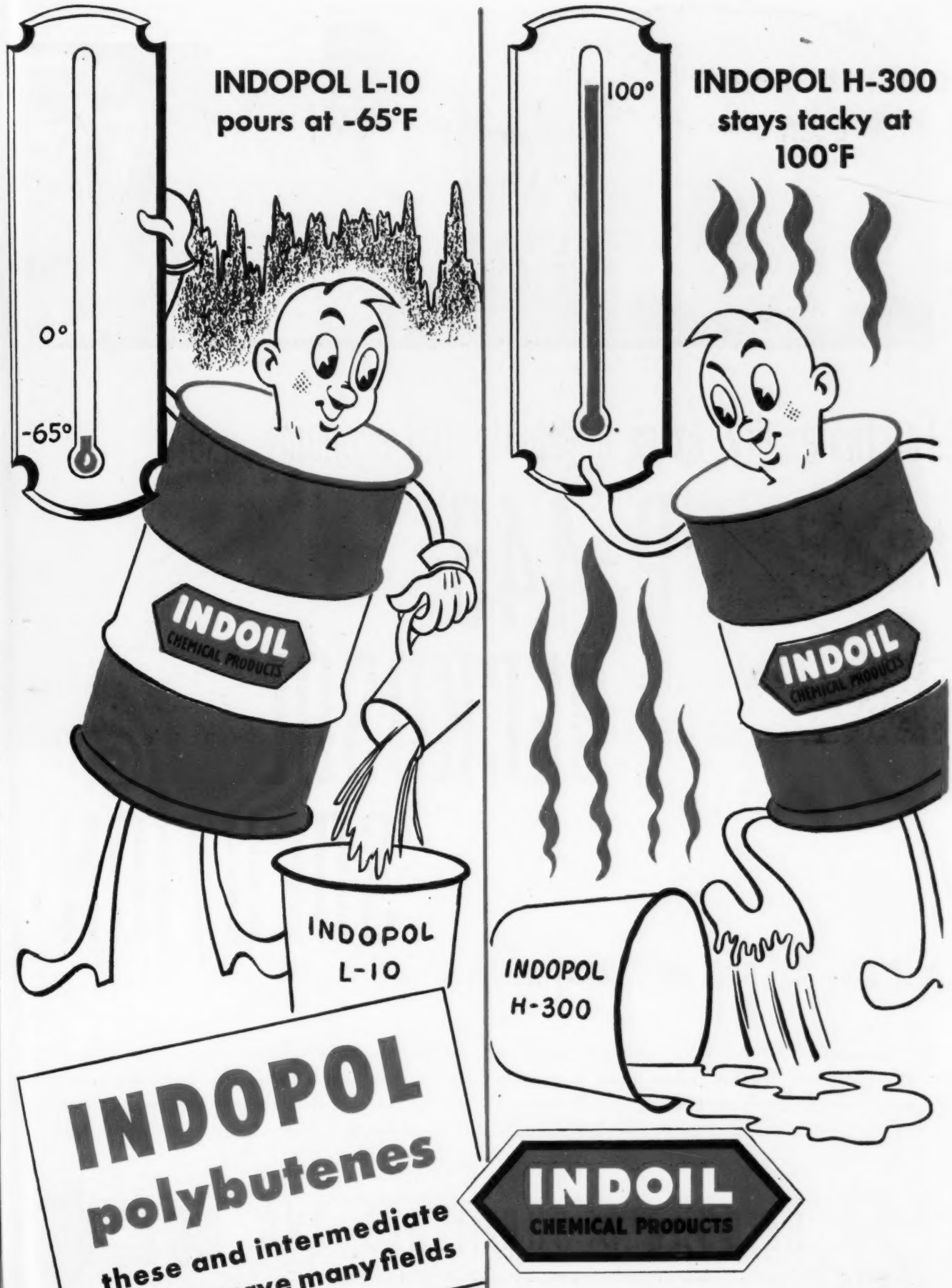
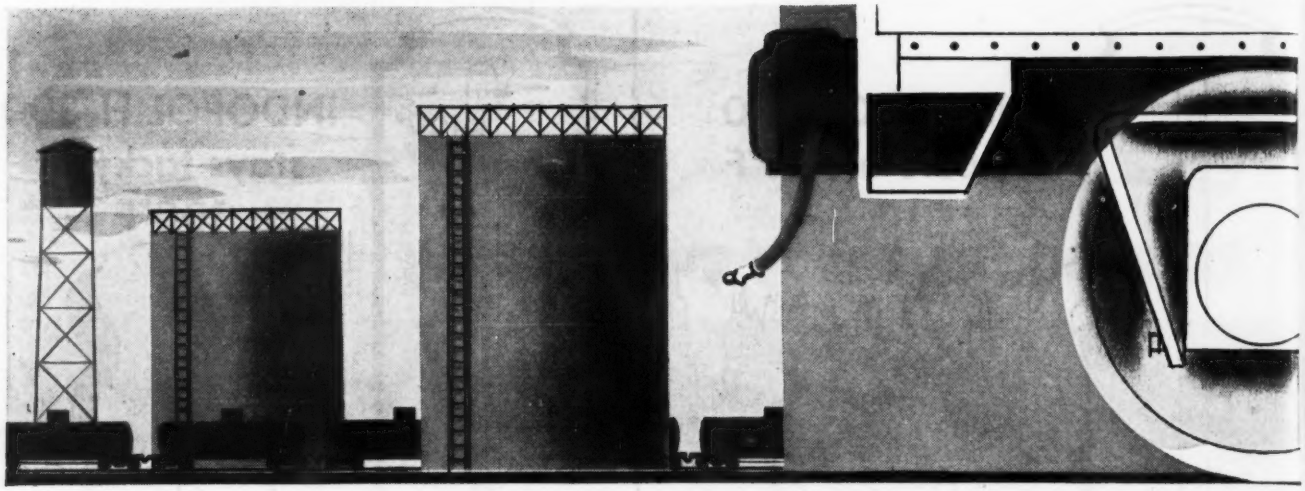
* *Serving Industry Since 1861.*

JOSEPH TURNER & CO

83 Exchange Place, Providence, R. I. RIDGEFIELD, NEW JERSEY 435 N. Michigan Ave., Chicago 11, Ill.



STANDARD OIL COMPANY (INDIANA)
CHEMICAL PRODUCTS DEPARTMENT
910 South Michigan Avenue Chicago 80, Illinois



For faster dry, extra durability and economy, use

P-443 BECKOSOL SOLUTION

in structural steel paints and machinery enamels

Air-dried or baked finishes for metal are better in every way when this fine alkyd resin is present. Pigment compatibility is outstanding, and drying to a high, excellently retained gloss is rapid. Resistance to abrasion, alkalis, grease, water and weather is uniformly excellent after baking, and ranges from fair to excellent when air-dried. Details and a sample are available from the Sales Department at Detroit.

REICHHOLD CHEMICALS, INC.

RCI

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Merry Christmas
MALLINCKRODT CHEMICAL WORKS
80 YEARS OF SERVICE TO CHEMICAL USERS
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TURN FIRST TO PFIZER FOR GLUCONATES

PFIZER SODIUM GLUCONATE

$NaC_6H_{11}O_7$
Molecular weight 218.13
White crystalline product
Soluble in water

PFIZER CALCIUM GLUCONATE

$CaC_6H_{11}O_7.H_2O$
Molecular weight 448.27
White crystalline salt
Solubility in cold water:
3 grams per 100 cc of water
Readily soluble at high temperatures

PFIZER COPPER GLUCONATE

$Cu(C_6H_{11}O_7)_2$
Blue crystalline powder

PFIZER FERROUS GLUCONATE

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Brownish yellow powder

Many pharmaceutical manufacturers, food manufacturers and users of gluconates for other industrial purposes *turn first to Pfizer*. With some, the deciding factor is their own experience with the consistently high quality of Pfizer products in general and gluconates particularly. With others it is the reputation of Pfizer for almost a century as manufacturing chemists, and the knowledge of the extensive modern plant facilities for gluconate production. Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Ave., Chicago 10, Illinois; 605 Third Street, San Francisco 7, Calif.

PFIZER QUALITY

PFIZER *Manufacturing Chemists Since 1849*

5104

the Fireman and His Beard

Kelco Algins do *two* jobs for this railroad man—help to keep his locomotive boiler feed free of sediment and make his morning shave less of a chore.

Surprisingly versatile, Kelco Algins not only suit such widely-distant applications as colloids for boiler feed water compounds and shaving creams; they are equally applicable as:

Stabilizer for Ice Cream

Sizing Agent for Paperboard

Thickening Agent for Textile Printing Pastes

Hydrophilic Colloid for Cold Water Paints

Gel-forming Agent for Dental Impression Compounds

Suspending Agent for Chocolate Milk Drinks

— And countless other diversified commercial processes.

Kelco Algins are products of nature, rigidly processed to insure uniform results. They are non-variable, readily adjust themselves to critical changes of environment. Additionally, they are easy to handle and economical. A request on your letterhead will bring complete information in regard to their adaptation to your requirements.

KELCO REFINED ALGIN PRODUCTS

KELCO COMPANY

20 N. Wacker Drive
CHICAGO—6

31 Nassau Street
NEW YORK—5

530 W. Sixth Street
LOS ANGELES—14

Cable Address: KELCOALGIN—New York

Ever notice the cloudy, white mineral oil bottles in drug store windows on cold wintry days? This cold-induced haze is usually due to waxes and other high molecular weight bodies.

Medicinal white oil manufacturers can guard against this sales retarding quality by using Nuchar Activated Carbon during the processing. Nuchar absorbs objectionable color, taste and odor bodies leaving a water-white, neutral tasting white oil that will not haze during cold winter months.

In addition Nuchar removes impurities invisible to the naked eye, such as—colorless colloids, paraffin wax, unsaturates and sulphanates. In vegetable oils Nuchar Activated Carbon is widely used to remove Kreis bodies, phosphatides, chlorophyl, carotene and other color bodies as well as waxes which affect the saleability of the finished product.

If you have a purification problem or a product that needs "polishing up", it may prove advantageous to try Nuchar. Write us in detail about your specific problem and our technical staff will let you know whether Nuchar Activated Carbon can do a purification job for you.

NUCHAR **industrial CHEMICAL SALES**

division west virginia pulp and paper company

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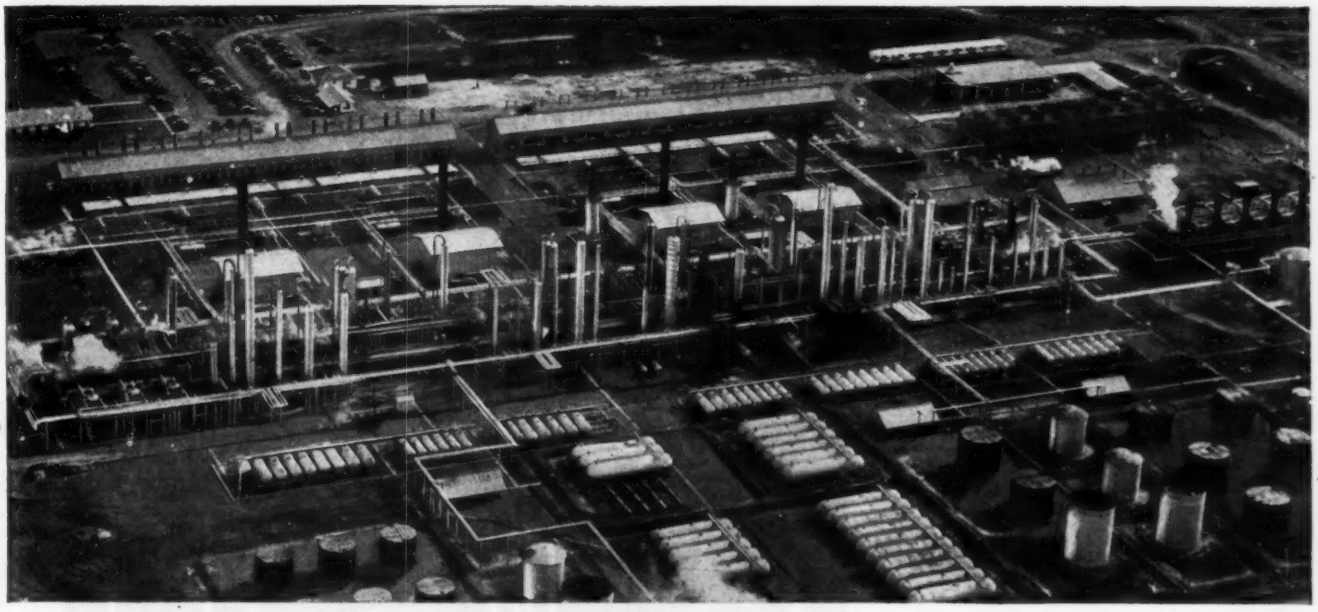
LOOK TO CELANESE

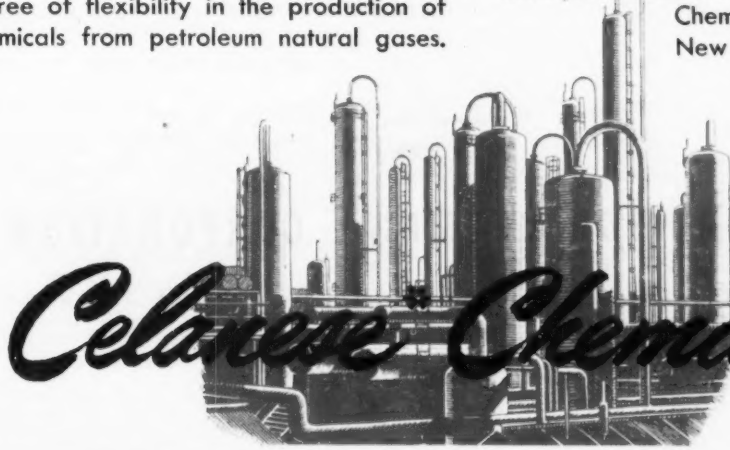


FOR ORGANIC CHEMICALS IN GREATER VOLUME

Look to Celanese as a dependable source of supply for your chemical requirements. A leading producer of Formaldehyde, Acetaldehyde and Acetic Acid, Celanese is also producing Methanol, Acetone, n-Propyl and iso-Propyl Alcohols in addition to other related organic compounds.

Fifteen years of Celanese research in the field of petroleum chemistry have provided the large Celanese Chemcel plant, at Bishop, Texas, with a high degree of flexibility in the production of organic chemicals from petroleum natural gases. This flexibility has enabled Celanese to meet the constantly changing needs of chemical markets for basic organic chemicals and important new compounds.

New chemicals are continuously being developed in the extensive Celanese laboratories. Specifications on new products as well as data on a regular list of Celanese* organic chemicals are available on request. CELANESE CORPORATION OF AMERICA, Chemical Division, 180 Madison Ave., New York 16, N. Y.



Celanese Chemicals

*Reg. U. S. Pat. Off.

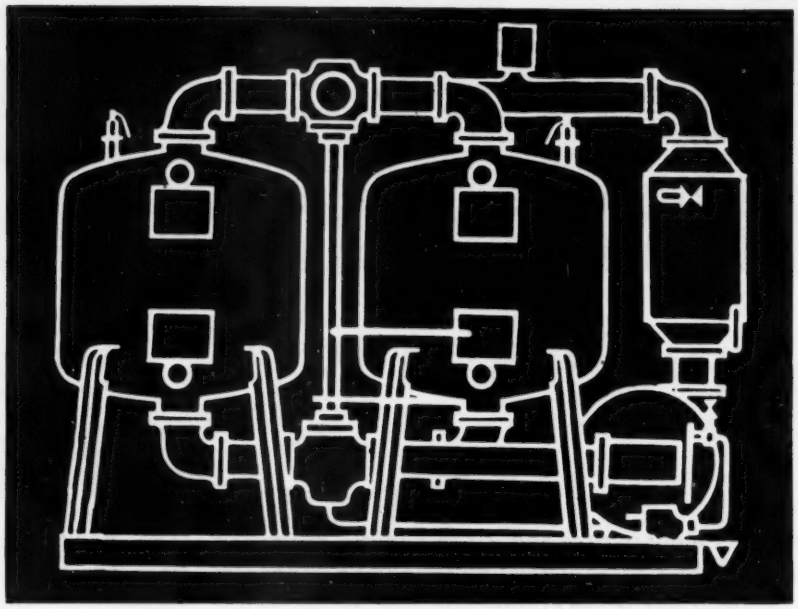
ALDEHYDES · ALCOHOLS · ACIDS · SOLVENTS · GLYCOLS · KETONES · PLASTICIZERS

If YOUR process involves the removal of moisture from gases...

Consult Davison

Custom Built Dual Tower Silica Gel Dehydrators *by Davison*

ultra dry AIR, OXYGEN, NITROGEN, HYDROGEN and other gases effectively and economically.



Davison offers you unparalleled experience gained through years of research in the field of dehydration of gases. This experience is available for the design of Dual Tower Silica Gel Dehydrators to meet your specific needs.

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

BALTIMORE 3, MARYLAND

ENGINEERING DIVISION

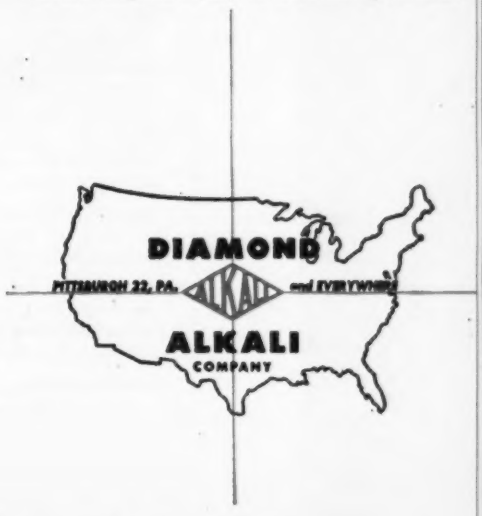
In the manufacture of pulp and paper, Diamond products serve in many ways. One of the most important chemicals used by paper-makers is Chlorine, the major application being for bleaching paper pulp. Diamond is a large supplier of Liquid Chlorine. Chlorine is employed also for slime control in paper mills by treating the entering water as well as white water suspension with this product.

Diamond Soda Ash and Caustic Soda are both used in the process of digesting pulp, and for de-inking and reclaiming waste paper. The high quality and uniformity of these Diamond products is well-known to manufacturers of paper and pulp.

A relatively new Diamond product, Chlorowax, is used in paper treating formulae. Chlorowax improves gloss, increases water-repellency and adhesion. Diamond Calcium Carbonate also is used for paper coating.

In this industry as in other industries served by Diamond, the uniformity and high quality of Diamond products improve manufacturing processes and aid in maintaining the quality of the finished product.

The mass-production methods employed in the manufacture of paper-pulp make good use of the uniform dependability of Diamond products.



FOR YOUR INFORMATION

New Uses For
AROCLORS

Promise New Profits, New Performance

In the AROCLORS (chlorinated biphenyl and chlorinated poly-phenyls) Monsanto offers industry more than 25 starting points that can lead to many an improvement in profits, processing, product performance and production costs. Manufactured exclusively by Monsanto, the AROCLORS comprise a "family" of over 25 chemical compositions, unique in the field of synthetics. At present, they fill many and varied requirements not met by materials previously available. Their future potential is even greater—they possess numerous interesting properties that suggest wider fields of application still awaiting development. To help uncover new and profitable uses for the AROCLORS, a list of their principal characteristics and applications is included here.

New ideas for you from these suggested uses

Electrical Materials and Equipment . . . Nonflammability, high resistivity, high dielectric strength and low power factor of liquid resinous AROCLORS are extremely useful in many electrical applications. Coatings for underground cables are additionally protected by AROCLORS against corrosion and attack by termites.

Hydraulic Pressure Medium . . . The AROCLORS contribute an unusually high safety factor when used as hydraulic media in high-pressure operations such as zinc-alloy die casting. Possible line leaks or breaks, even in the presence of open flames, constitute no fire hazard because of the nonflammable characteristics of the AROCLORS.

Soil Poisoning . . . Added to fill-in soils in any type of construction, the AROCLORS prevent attack by termites.

Chlorinated Rubber Finishes . . . When used as plasticizers for chlorinated rubber, AROCLORS add toughness and flexibility. Valuable as finishes for alkaline surfaces such as brick, concrete, stucco, and for acid, alkali and moisture-resistant coatings.

Paints and Varnishes . . . AROCLORS are used to give great durability and adhesion and to vary the degree of hardness or flexibility in quick-drying paints.

Adhesives, water-insoluble.

Expansion Medium, in bellows controls and thermostats.

Liquid Heat Transfer Medium.

High Temperature Lubrication.

Ethyl Cellulose; Nitrocellulose, to impart weather resistance, luster, adhesion, decreased burning rate.

Properties of the AROCLORS

The AROCLORS range in form and appearance from mobile oily liquids to fine white crystals and hard transparent resins. They possess the following properties:

Adhesion . . . AROCLOR resins adhere strongly to glass, metal, or smooth varnished or lacquered surfaces.

Electrical . . . High resistivity, high dielectric strength and low power factor are characteristics of the AROCLORS.

Thermal Conductivity . . . Of particular value as high-temperature, low-pressure fluid heat transfer medium.

Non-Drying . . . When exposed to air, even in thin films, no noticeable oxidation or hardening occurs. Drying rate of lacquer films is not retarded.

Nonflammability High safety factor in high-temperature, high pressure applications. When fluxed with resins and pitch-like materials, AROCLORS give a product having a decreased fire hazard.

Stability . . . AROCLORS have marked stability towards alkalies, acids, heat and oxidation.

Compatibility . . . AROCLORS are compatible with most of the common plastic materials.

Solubility . . . AROCLORS are easily soluble in most of the common organic solvents and drying oils. They are insoluble in water.

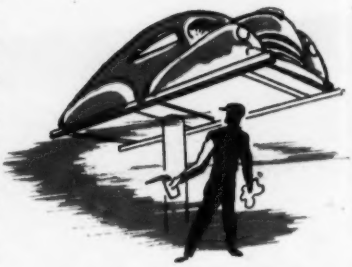
Thermoplasticity . . . No condensation or hardening appears upon repeated melting and cooling.

Vaporization . . . The AROCLORS have low vaporization losses.

Aroclors. Reg. U. S Pat Off

2, 4 D
2, 4 D Sodium Salt

Formulators and processors are invited to send for information on 2, 4 D and 2, 4 D Sodium Salt—now available in commercial quantities. Mail the coupon on the facing page—or write, outlining any special information you require.



Good News for the Petroleum Industry

Two recent developments by the Petroleum Chemicals Department of Monsanto are of special interest to the petroleum industry—SANTOPOID* 29 and SANTODEX,* both oil additives.

SANTOPOID 29 is an all-purpose gear-lubricant additive that simplifies blending and cuts distribution costs. Used with suitable base oil stocks, it is now possible to blend a single, all-purpose lubricant that will serve equally well in hypoid or conventional gears . . . in high-speed passenger car or heavy-duty truck service.

SANTODEX is a viscosity-index-improver that makes possible viscosity indices up to 140 or higher, depending on the base oil stock with which it is blended. It is an all-hydrocarbon material and improves the viscosity index of oils without the expense and waste of extreme refining. Readily soluble in mineral oil, does not stratify or separate from a lubricant; can be easily compounded in conventional refinery equipment.

Ask for technical data—use coupon on opposite page.

*Reg U. S. Pat. Off.

News of Monsanto Chemicals for the Process Industries...December, 1947

NON-TOXIC... Tubing, Coatings, Sheets

Where lack of non-toxicity is essential in a plasticizer to be used for such applications as tubing for the transfer of beer, beverages, milk and liquid foods—industry is turning more and more to the use of Monsanto Santicizers B-16, E-15 and M-17.

In addition to their non-toxicity, these glycollates impart no characteristic odor or taste. This makes them further useful in their application to can and cap liners. They are also used in hospital sheetings, acrylic dentures and similar products.

Quick Facts

SANTICIZER B-16 . . Compatible with most resins; imparts good flexibility and clear, brilliant films that are tough, moisture resistant, and have good weathering qualities. Especially good with vinyl resins and nitrocellulose.

SANTICIZER E-15 . . . An excellent plasticizer, particularly for nitrocellulose and cellulose acetate and for most resins. Light-fast and relatively non-volatile, even from the thinnest films. With both acetyl and nitrocellulose, gives clear, tough, flexible films with greatly increased resistance to moisture penetration.

SANTICIZER M-17 . . . A solvent plasticizer for vinyls and cellulosics, imparting a high degree of plasticity. Probably the best cellulose acetate plasticizer available. Insoluble in petroleum products—confers oil resistance to films in which it is used.

MORE INFORMATION . . . Send for literature, technical data, samples. If you wish specific information, a letter outlining your application problems will receive prompt attention.

Santicizer: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, 1703 South Second Street, St. Louis 4, Missouri. District Sales Offices: New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Houston, Akron, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Limited, Montreal.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY
1703 South Second Street, St. Louis 4, Missouri

Please send me further information and technical data on.....

.....

Name.....

Firm.....

Address.....

City.....State.....

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your business.*

Ever hear of a salesman who knew how to sew?

SEEMS THERE WAS a young salesman who took a job with a company that makes electric blankets. He figured he could sell those blankets a lot better if he knew how to *make* one.

So he spent enough time in the factory to learn every step in their manufacture—cutting, wiring, sewing and all. The experience proved so valuable that today the company requires every salesman to *make* one of the blankets he sells.

That sounds like such a good idea that maybe it could work *both ways*. Let the *production man* learn something about how they sell what he makes. The result should be a better job in both departments, for producing and selling have one important thing in common. Both thrive on *mechanization*.

In the manufacture of a sale, for example, it usually takes five separate operations to find a prospect and convert him into a customer. To expect the salesman to perform all five would be like manufacturing the product itself entirely by hand—slow and far too costly.

So the salesman depends on a *machine* to take over part of his selling job. Finding prospects, arousing their interest, creating a preference for his company's product or service—all these operations must be *mechanized* if sales are to be manufactured at a profit.

Advertising is the machine that puts selling on a mass production basis. And in the business press—with its tremendous concentration of hand-picked readers—the machine operates at its *highest efficiency*.

Just how efficiently does business paper advertising work? If you'd like to see some examples, we'll be glad to send you a recent ABP folder on actual results. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.

CHEMICAL INDUSTRIES

is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared Monthly by U. S. Industrial Chemicals, Inc.*

U.S.I. CHEMICAL NEWS

December ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1947

Claims Pickling Solutions Can Be Regenerated by Means of Ethyl Alcohol

Process Said to Be Efficient, Economical — Regains All Acid

An efficient and economical method of removing the bulk, or practically all, of the iron contents of pickling solutions and regaining all of the acid solution for further pickling treatment is based on the addition of ethyl alcohol to the spent pickling liquor. A complete description of the process is contained in a government report issued recently.

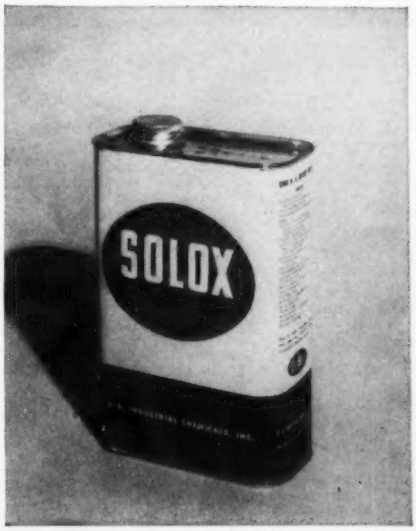
The alcohol is not added in a concentrated form but is diluted with three times its own volume of distilled water. One gallon of this mixture is added to every ten gallons of pickling solution and cooled down to room temperature. The solution is stirred thoroughly, all the iron precipitating in the form of iron sulfate. The alcohol can be removed by fractional distillation, while the liquor is reacidified to full strength.

Complete Regeneration

The liquor regenerated in this fashion is said to possess all the characteristics of a freshly made solution. Mixtures of surfuric and hydrochloric acids can also be regenerated by this process, the sulfates crystallizing out, while the harmless chlorides remain in solution.

The ethyl alcohol process is claimed to be of special importance for the regeneration of electrolytic pickling baths in which the articles after de-scaling are covered with a thin protective film of lead, zinc, copper, tin or cadmium.

NEW PACKAGE DESIGN



Solox, U.S.I.'s popular proprietary alcohol-type solvent for general use, is now packaged in attractive modern cans.

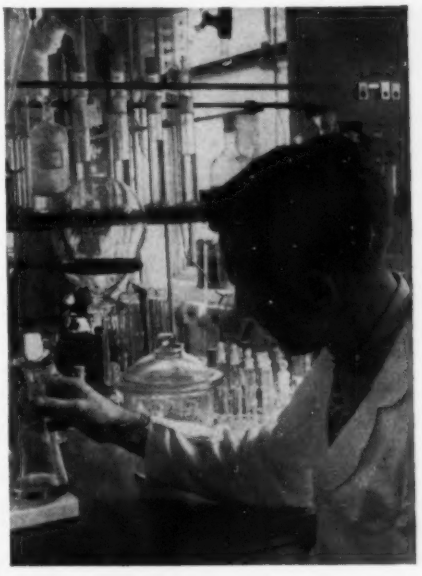
Many Important New Commercial Alcohols To Be Made Available From Fischer-Tropsch Process

Large Quantities Will Help Alleviate Continued Material Shortages —Products Will Include 2-Methyl-1-Pentanol, 2-Ethyl-1-Hexanol

Shortage of important alcohols currently experienced in the chemical industry will be greatly alleviated by new supplies to be made available by U.S.I. These products, basic to the industry, will be among the wide range of chemicals which U.S.I. will market from the American version of the Fischer-Tropsch process.

Increased Supplies of Ethanol, Butanol

Wartime shortages of ethanol and butanol did not stop with the end of hostilities. Demand for these versatile solvents exceeded expectations, and users continue to experience difficulty in meeting their total needs. The new Fischer-Tropsch source for these two alcohols has received enthusiastic response from members of the chemical and related industries.



***New Alcohols* in large quantities will be made available by U.S.I. from the output of the first Fischer-Tropsch plants. Constant research in U.S.I. laboratories accelerates the development of these new compounds.**

Makes n-Amyl Alcohol Commercially Available

In addition to ethanol and butanol, U.S.I. will also offer n-propyl and n-amyl alcohol. Normal amyl alcohol has not been available commercially before, and the commercial availability of n-propyl alcohol has been comparatively recent. The production of n-amyl alcohol will offer new opportunities for research and development on this basic chemical. The paint, varnish, and lacquer, and the pharmaceutical industries, in particular, are expected to make wide use of both these compounds.

MORE

New Cancer Treatment Shows Promising Results

The use of urethan as a treatment for prostatic cancer has shown promising results, according to a report emanating from a midwestern university. Urethan is said to reduce the size of the cancer and to bring about beneficial results even when other therapies have failed. Other experimenters have reported favorable results with the use of urethans on experimental animal tumors, and in the treatment of leukemia (cancer of the blood).

Nylon Hair Brush Broken? Here's How to Repair It

While many hair brushes today have nylon bristles, the handles and backs are usually made of some other plastic. If it's transparent, it's probably polymethyl methacrylate—and there's no trick at all sticking pieces of this together. The best adhesive is a solution of the plastic itself in acetone. Household cements are a second choice, but do a good job too.

Titanium Found to Keep Metals from 'Tiring'

When a piece of iron, like a wire paper clip, is bent many times, it gets "tired" and finally breaks with about half the stress required when the metal is fresh. However, by alloying the iron with certain other metals, of which titanium is most effective, it tires much less easily, according to a paper read recently before an American scientific society. The study showed that, after titanium, most effective in improving fatigue strength of iron are molybdenum, silicon, manganese, nickel, cobalt, and chromium.

8500 Rare Chemicals Listed

Need parachlorobenzotrifluoride? muconic acid? beta-isopropoxypropionitrile? potassium tertiary-butoxide? or any other rare chemicals? One way to locate them is to contact the National Registry of Rare Chemicals. Their files, which list the supply sources of more than 8,500 rare chemicals, are the most complete of their kind in this nation.

ADVERTISEMENT—*This entire page is a paid advertisement*

December **U.S.I. CHEMICAL NEWS** ★ 1947

CONTINUED

NEW COMMERCIAL ALCOHOLS

Variety of New Alcohols

U.S.I. will also market 2-methyl-1-pentanol and 2-ethyl-1-hexanol, new alcohols derived from Fischer-Tropsch aldehydes. The large quantity of aldehydes made from the Fischer-Tropsch process are of primary interest because they are raw materials for long-chain, high-molecular-weight alcohols. Included as possible products from synthesis beginning with aldehydes are: 2-methyl-1-butanol, 2-ethyl-butanol, n-hexanol, 2-ethyl-1-pentanol, and 2-methyl-1-hexanol.

Wide Range of Applications

Interest is focused on these alcohols to a large extent because their chemical combinations with monobasic and dibasic acids yield products of a wide range of applications. The acetates of the lower alcohols are widely known as lacquer solvents. Higher boiling esters resulting from the reaction of aliphatic acids and longer chain alcohols offer solutions of problems when higher boiling solvents are required. Of even greater interest, however, are the higher alcohol esters of the dibasic acids such as phthalic and sebacic. These esters are well known as plasticizers for a wide range of resinous materials.

Will Stimulate Development

The more certain raw material supply made possible by the Fischer-Tropsch process will undoubtedly stimulate development and increase the application of these materials. The accelerating use of all resins, with its correspondingly increased need for plasticizers, makes the provision of a new supply of alcohols especially significant.

Plant construction and marketing plans required by this new source of materials are being actively pursued, and it is anticipated that these new materials will be available within a two-year period. Prior to that time, U.S.I. will offer sample quantities of these new alcohols. The date of availability will be announced in these columns.

FIRST PACIFIC COAST CHEMICAL EXPOSITION ATTRACTS 15,000

Ninety-three exhibitors, representing leading manufacturers of chemicals and solvents on the Pacific coast and many national concerns with west coast offices, played host to approximately 15,000 visitors at the first Pacific Coast Chemical Exposition in San Francisco. The U.S.I. exhibit, featuring a wide range of U.S.I. chemicals, proved a popular meeting place. Here, left to right, seated, are R. C. Curtis of the Dow Chemical Co., San Francisco; S. L. Schwartz of the L. H. Butcher Co., Los Angeles; D. E. Eichelberger of the American Marietta Co., Seattle; L. A. Keane, U.S.I., New York; Ronald Benson, of the Carl F. Miller Co., Seattle; and Norman MacBeth of the MacBeth Corporation, New York. Standing, in the same order are G. C. Dohm, Clyde West, and R. E. Alexander of U.S.I., Los Angeles, and Wells Newell, U.S.I., New York.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing U.S.I.

To cut tinting time in oil paints and enamels, a new compound has been marketed which is said to eliminate all types of silking, flooding, and floating. **(No. 265)**

USI

A new rubber, claimed to have excellent dry heat resistance and to maintain its rubbery characteristics even at 300 deg. F. for 700 hours, is alleged to be easier to manufacture than butadiene rubbers. **(No. 266)**

USI

To improve the surface qualities of polystyrene plastics, a new treatment is offered which is said to increase mar resistance, repolishability, light transmission, and resistance to solvents. The process does not require special equipment and is completed in 20 minutes, the makers state. **(No. 267)**

USI

For use in dispersions and emulsions, a low-cost industrial product is now available in tank car quantities. This by-product is rich in gums and pentosans. **(No. 268)**

USI

A new fungicide, stated to provide permanent protection against dry rot, fungi, and most insects, is claimed to be easily-applied, non-toxic, non-injurious to wood or fabric and to maintain its strength indefinitely even after washings. **(No. 269)**

USI

To help prevent eye injuries from acids, an eye washing fountain is now on the market. It is ready for instant action on the scene of the accident, and is operated by the forehead, leaving hands free to open eyelids and wash both eyes, according to the manufacturer's description. **(No. 270)**

USI

To extend phenolic resin and protein adhesives, a new plywood glue constituent has been developed which is claimed to provide uniform spreading over protracted periods, and to decrease glue-line costs. **(No. 271)**

USI

An improved slide rule is now being produced. According to the manufacturer, the scales on the front of the rule are so arranged that only one setting of the hairline gives with each result its square, cube root, and logarithm. The log scale on the back gives five readings with each setting of the hairline. **(No. 272)**

USI

A new adhesive for carpets, described as a self-curing liquid, is said to be strong enough to butt-join sections of carpet padding without reinforcement. It can also be used to repair areas of dry rot, the makers claim. **(No. 273)**

USI

To prevent pre-cured rubbers from sticking, a new pre-cure wax finish is offered which is said to be applicable to molded, extruded, or calendered products and to serve as a mold release as well. **(No. 274)**

U.S.I INDUSTRIAL CHEMICALS, INC.

60 EAST 42ND ST., NEW YORK 17, N. Y. U.S.I. BRANCHES IN ALL PRINCIPAL CITIES

ALCOHOLS
Amyl Alcohol
Butanol (Normal Butyl Alcohol)
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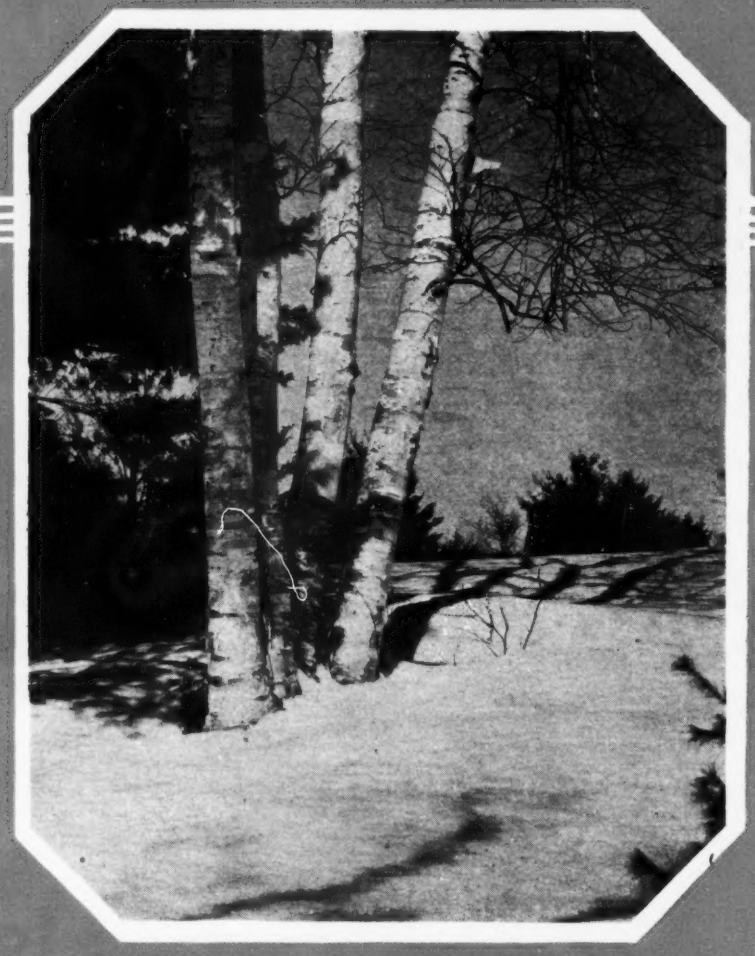

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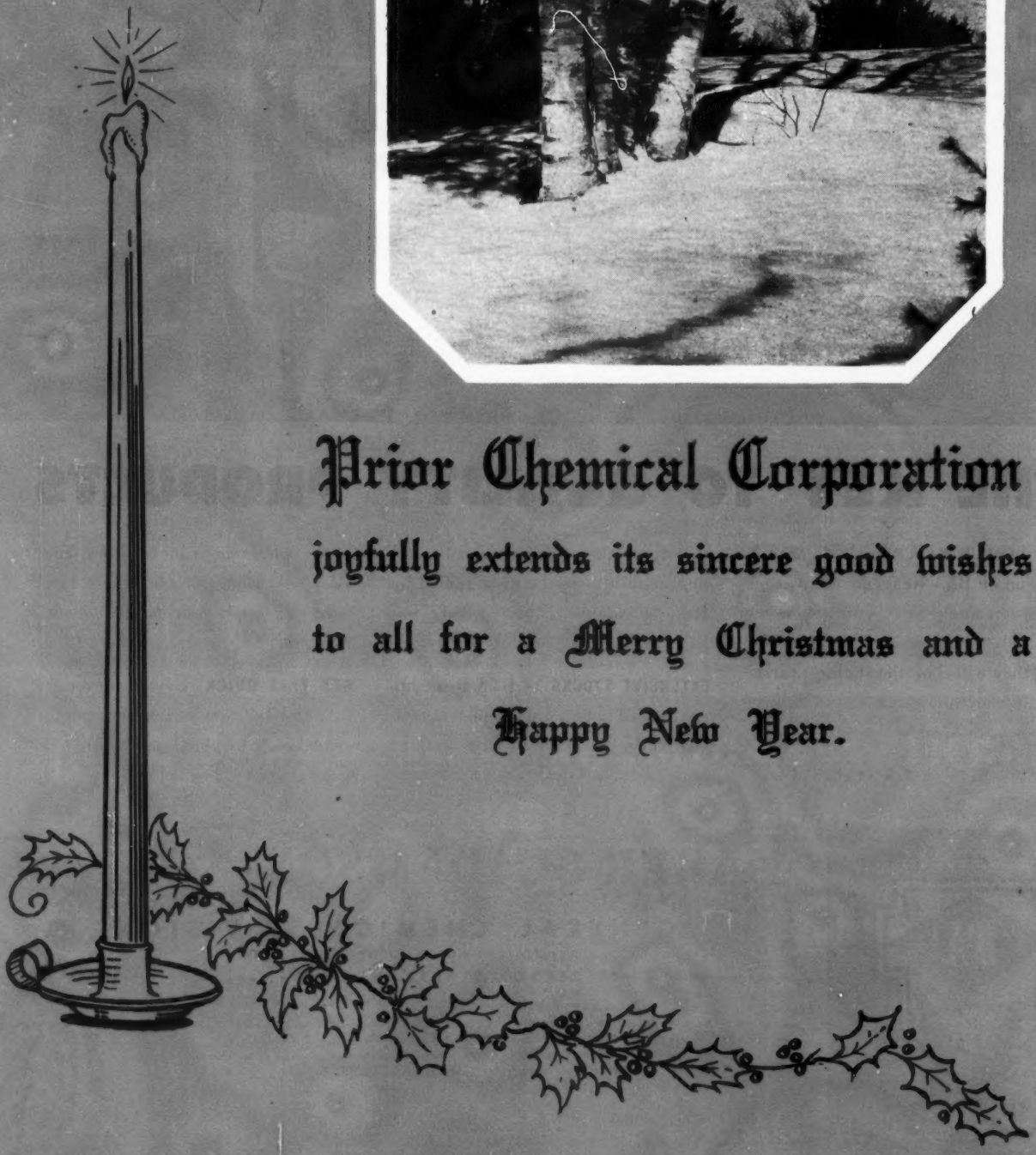

Chemical Industries

THE MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

For Your Information:

Newsletter
December, 1947

Although no official announcement will be forthcoming for some little time, Sharples Chemicals Inc. has a new liquid, non-ionic detergent in the pilot-plant stage at its Wyandotte, Mich. works. As yet plans for commercial production and distribution are still under development.

Within the next few months you will hear about a new tanning process which has been developed by two well-known leather chemists but is, at the moment, still being kept under wraps. Significant thing about the process is that it does not use natural tanning materials, yet is claimed to give a pliable as well as hydro-thermally-stable leather.

* * * * *

Several major chemical companies are currently exhibiting a much-more-than-casual interest in West Coast phenol prospects. (Actually, no less than eight companies have been engaged in weighing the outlook for phenol manufacture). One of the most important factors sparking this interest is, of course, the expanding plywood business -- a robust consumer of phenolic adhesives. Estimated West Coast needs by 1950: 43 million pounds of phenol. Probable plant locations: Puget Sound or Tacoma, Wash.

Due to attract more than a little attention is a novel cake-form synthetic detergent which Colgate-Palmolive-Peet Co. is quietly test marketing. Christened Vel Beauty Bar, the new item contains no soap (its active ingredient: a sulfated monoglyceride). Initial consumer trials are under way in Lansing and Grand Rapids, Mich., and Duluth, Minn.

* * * * *

International Minerals & Chemical Corp. is busy conducting pilot-plant studies on two new processes for chemical grade potassium chloride and the more efficient manufacture of potassium sulfate. Several improved methods for the production of monosodium glutamate have also been developed and are ready for the pilot plant.

If plans go according to schedule, the Du Pont Co. will bring in a new methanol plant at Sabine, Texas, during the first quarter of next year. The entire output will be barged to Belle, W. Va., where it will be refined. Construction of a Sabine refining unit is being considered, which, if completed, would mean a revamping of the company's distribution set-up.

Standard Oil Co. of Indiana now has its alkyl aryl sulfonate (Newsletter, June, 1947) in the pilot-plant, hopes to have a full-scale unit in operation at its Wood River refinery early in 1949. Marketing plans are still in the formative stage, and, for the time being at least, the company is not planning to produce a spray-dried material.

Of possible long range significance are experiments being pushed by the U. S. Department of Agriculture to determine the possibility of killing disease-carrying pests by feeding insecticides to animals, thereby making their blood toxic to biting insects. To date some 64 compounds have been tested, and typhus-carrying lice and yellow fever-carrying mosquitoes have been killed in this way. Sufficient research has not been conducted to evaluate safety or feasibility, but the experiments open up a field for exploration of new compounds -- specifically to find those deadly to parasites, less damaging to animal hosts.

* * * * *

Westvaco Chlorine Products Corp., which has been marketing its insecticide specialties under descriptive names (such as DDT powder, etc.) is about to promote a new set of tradenames. DDT-containing items will be tagged Devex, benzene hexachloride formulations, Trivex, hexaethyltetraphosphate materials, Fosvex.

Within the near future a New York firm of industrial designers will begin a nation-wide survey for Airkem, Inc. The objective: to develop a broader range of equipment for the application of air-freshening and odor-counteracting compounds. A major hope: design of space-saving units which can be used with standard air-conditioning systems.

Monsanto Chemical Co., which has just completed a new Santomerse unit at East St. Louis, is currently expecting to bring in another synthetic caffeine plant next spring.

* * * * *

Here and There:

Now emerging from the pilot-plant is a novel borate ester claimed to be a "natural" pressure-sensitive adhesive. One advantage: completely transparent, it endows cellophane-base adhesive tape with more-than-ordinary "eye-appeal" ... NBS casting resin (announced a few months back by the Bureau of Standards) is now being produced in commercial quantities by Mathieson Alkali Works. Dichlorostyrene is the essential ingredient ... Next month the 110-year old Eaton-Clark Co., Detroit, will change its corporate name to Eaton Chemical and Dyestuff Co. ... The Du Pont Co., soon to enter the tetraethyl lead field, will not push consumer advertising, as Ethyl Corp. has done for years. Ethyl, incidentally, is dropping its Ethyl Cleaner line ... General Aniline & Film Corp. is enlarging its special products division, now known as Antara Products, to push sales of household products such as Chat and Glim ... Zirconium oxide, long used mainly as a refractory, has recently entered a new field, is finding wide use as an abrasive for polishing glass and marble. It competes with iron oxides, but more particularly with difficultly-obtainable cerium oxide ... A new addition to Boyle-Midway's Black Flag line, now being introduced, is a roach spray; its toxic agent: 2 per cent chlordane ... Stanolind Oil and Gas Co. plans construction of a natural gasoline plant in the Levelland Field, Hockley County, Texas.

The Editors

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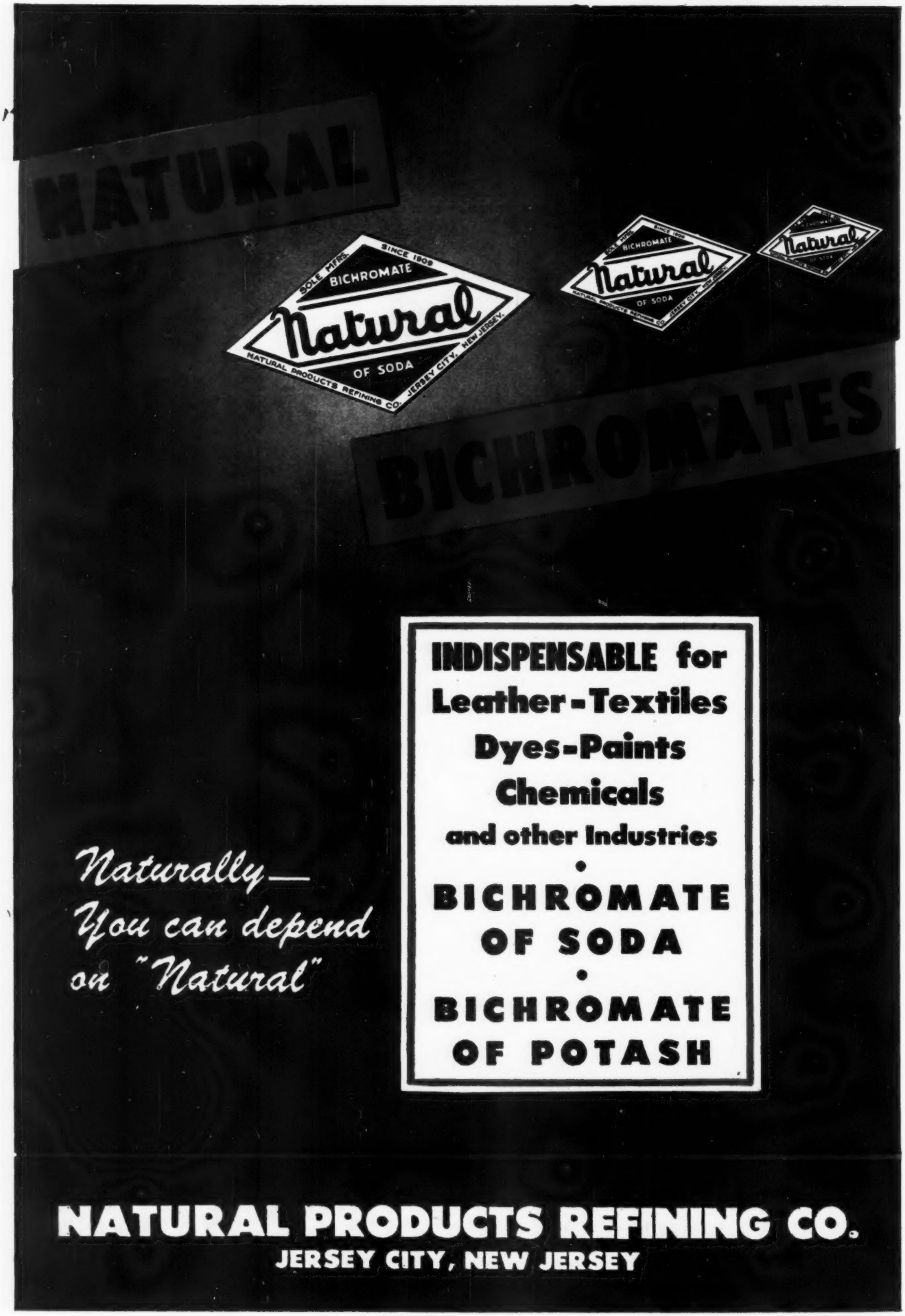
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Editorial CI

CAN WE DO BUSINESS?

by ***ROBERT L. TAYLOR, Editor***

A CURRENT TREND IN industrial research policies and objectives was emphasized by Raymond Stevens, vice president of Arthur D. Little, Inc., in a discussion a short while ago before the Industrial Research Institute. The point of his remarks was that research is becoming more and more influenced by considerations of practical economics. "The basic questions go beyond molecular reactions or physical changes. Even patent aspects are minor. The real question is—can we do business? Can a market be created?"

The thing that has puzzled us is that this "economic age" of research has been so long in arriving. More than once have we at CHEMICAL INDUSTRIES been accused of adulterating pure science with economics. We are glad to know that the time has come when such admixtures are no longer considered uncouth or ill-mannered in polite scientific society.

Quite seriously, we believe this increased emphasis on market and price considerations in research planning is one of the best things that could happen to industry today. Effective mass distribution appears more and more to be a major key to continued high production in a free economy, and effective mass distribution in turn hinges on mass appeal and low price, two elements which must be engineered into a product from its very inception.

No longer can a research department consider its job done and its obligation discharged when it has produced a workable process or a product that meets certain chemical and physical specifications. It must also give evidence that it, too, has considered—from its special standpoint, to be sure—the questions of marketability and cost of production.

We wonder, however, if adding an economics or market expert to the research staff, as Mr. Stevens mentioned a number of companies are doing, takes care entirely of this problem of getting the economic angle into the research program? Should it not be acknowledged that the time has come when every chemist and chemical engineer engaged in applied research must be able to think along economic as well as technical lines, that economic considerations are something that must be applied throughout the research process and not alone at one special point in the procedure?

If the research chemist as well as the market expert can be made to fully realize the fact that behind every new project lies the basic question "Can we do business?" the chances are much better that we *will* do business, and at an expanding rather than a contracting rate.

Management's Responsibilities to Research

WHAT CONSTITUTES management's responsibilities to its research and scientific staffs is something that has assumed greater importance as research has reached the giant status it occupies in industry today. We have not seen a better definition of these responsibilities than that set forth recently by George W. Merck in his address in acceptance of the Chemical Industry Medal:

"First, managers of the chemical industry have to provide proper financial support. This can be done only if the enterprise is profitable, so that all research which the company needs can be continued in bad times as well as good, and so that research results can be properly developed and utilized.

"Second, managers of the chemical industry should provide the best facilities. Without proper tools and equipment, there can be little achievement.

"Third, managers of the chemical industry should maintain academic contacts. Through fellowships, grants, training programs, and exchange of professors and students, management should build a bridge between the fields of pure and applied science."

These precepts deserve careful thought both by managers and by research people in the process industries. A more general appreciation of them, and of their counterparts on the research side, should contribute to a closer and more fruitful relationship between these two important groups in industry.

Snow flakes
and
sleigh-bell
music
lacy frosting on window-panes
bright holly
on the door
Yule log and mistletoe and a gay and
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What's new

HIGH TARGET FOR MALEIC

Maleic anhydride output has been marking time, gathering momentum for an uphill spurt next year. So versatile is this tonnage chemical, the only wonder is that the spurt hasn't come sooner.

WHEN either a man or a chemical reaches the age of 28, it's time his career began to shape up. Ever since 1919, when maleic anhydride was born of benzene and air, assisted by Weiss and Downs (then of the Barrett Co.) and a vanadium oxide catalyst, this chemical has been getting its education in the industry and preparing for its life work.

Now, as 1948 is coming up, it's ready to make a name for itself. Carbide & Carbon Chemicals Corp., a former producer which bowed out of the picture in 1943, is returning to the roster. National Aniline Division of Allied Chemical & Dye Corp. is upping its output. Monsanto Chemical Co., which has heretofore recovered maleic as a by-product of phthalic manufacture, is constructing a unit which will be exclusively devoted to maleic production. And a new manufacturer, Reichhold Chemicals, Inc., is just coming into production (see CI Newsletters, October and November, 1947).

Hitching to a Star

Production over the past few years, as shown by the accompanying chart based on U. S. Tariff Commission figures, has, comparatively speaking, limped along. War demands caused a 60-per cent rise, from slightly less than 5 million pounds in 1941 to slightly over 8 million in 1942 and 1943: but 1944 output slid again to less than 8 million, and the estimated rise in 1945 was only 15 per cent—to 9 million pounds.

In view of this demonstrated dawdling in recent years, 1948 estimates of 25 to 30 million pounds, arrived at by persons close to the situation, are flabbergasting. That's a lot of maleic, but the star-grazing figure is supportable by a fairly sure foundation of supply and what appears to be a sound superstructure of uses. Let's take a look at the whence and whither: where is it all coming from, and where is it all going?

Whence

Maleic anhydride can be made from practically any raw material that has four carbon atoms in a chain: benzene, toluene, naphthalene, acenaphthene, anthracene, phenanthrene, furfural, butane, butylenes, cyclopentadiene, terpenes.

First production—and still the largest—was from benzene. Air oxidation with a suitable catalyst was first developed at Barrett, later taken over by National Aniline.

As phthalic anhydride surged to importance, more and more maleic was recovered as a by-product of its manufacture. Oxidation of naphthalene ordinarily yields 5 per cent or less maleic anhydride along with the phthalic, but conditions can be altered to control the ratio within wide limits. Monsanto has heretofore obtained its maleic in this way.

Carbide controls the patents for manufacture of maleic from C_4 hydrocarbons and their derivatives. Its reason for allowing maleic manufacture to lapse during the war is obvious: butylenes and other C_4's were needed for synthetic rubber.

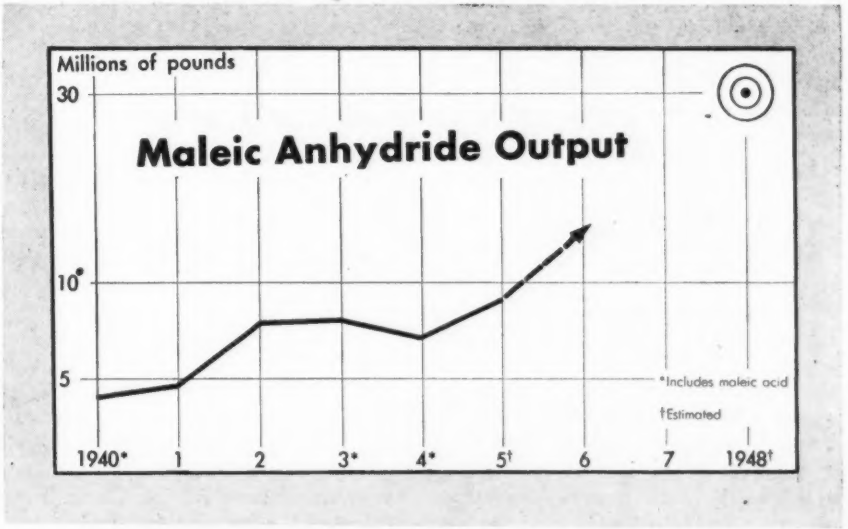
When the Germans needed maleic anhydride, they naturally turned to their jack-of-all-trades, acetylene. From it they made acetaldehyde, from that, crotonaldehyde, and the latter they oxidized to maleic.

Phthalic facilities can be converted to benzene oxidation, and those phthalic producers who depend on outside sources of naphthalene are eyeing maleic possibilities. Benzene is short, too, but the slowing of synthetic rubber output and the recent slackening of DDT demand have eased the situation to some extent.

Whither

Maleic anhydride is like a roomful of prize terriers: practically every atom is a reactive center. It is therefore extremely versatile in its reactions and, consequently, in its usefulness.

By far the biggest use is as a component in alkyd-type resins, where it generally confers better color, higher com-



MALEIC ANHYDRIDE: The bull's-eye is high, but the aim is true.

Courtesy National Aniline

MALEIC CYLINDERS: A virtuous circle projected.

patibility with nitrocellulose, and faster solvent release in lacquer formulations. The major proportion of the maleic anhydride going into resins is used in rosin alkyds. Here the maleic reacts both with the abietic acid (in a Diels-Alder addition) and with the polyhydric alcohols (by esterification). Another large share goes into straight maleic and maleic-terpene alkyds. The latter are especially useful as heat-sealing adhesives.

In 1937 maleic anhydride went into less than 3 million pounds of alkyd resins, valued at $0.5 million. Last year the resin poundage reached 75 million, the value, $17 million.

Newer maleic resins of the non-alkyd type are copolymers with styrene, vinyl chloride-acetate, and other vinyl-type monomers. Last year the styrene copolymer alone reached a 113,000-pound output. Hovey and Hodgkins, back in 1941, said, "There is no doubt that maleic anhydride is one of the most important building blocks available for the formation of synthetic resins, and the prediction that its use will greatly expand in the future is no idle speculation . . ." Last year proved their point, and next year will add another notch to the stick.

More Than One String

Maleic anhydride has more than one string to its bow. In addition to resins, it is useful in synthetic surface-active agents, rubber, toluene refining, and food products.

American Cyanamid Co. uses large quantities of maleic esters for its Aerosol wetting agents—sulfosuccinic esters made by adding sodium bisulfite across the double bond of maleic esters. Hydration of maleic acid gives malic acid, an important acidulant in the food industry; monochloromaleic anhydride is used in the manufacture of synthetic rubber; ammonia reacts with maleic anhydride to form aspartic acid; and hydrogenation gives succinic acid, which is becoming increasingly useful in polymers and plasticizers. A recently described technique uses maleic acid to remove color-forming dienes from toluene, and a growing use of the anhydride is for upgrading of drying and semi-drying oils.

It is a fairly general rule that a chemical product gets caught in not a vicious, but a virtuous, circle. As its uses multiply, its production rises and its cost goes down. The lower price opens up still more uses, and off it goes again.

Maleic may well be ready for the circle game. It is now selling at 25¢ per pound, phthalic at 17¢. The next few years may see a closing of the gap. But even at the present price structure, there are enough large-scale uses for this versatile chemical to justify huzzas in the maleic camp.

TOXIC BUT SAFE

Recent experiments indicate that tetraethyl pyrophosphate, the potent new insecticide being evaluated by several chemical concerns, decomposes in the presence of atmospheric moisture to diethyl orthophosphoric acid, a relatively non-toxic substance.

The rate of decomposition, according to the U. S. Dept. of Agriculture, is that of a first order reaction. Its half-life at 77° F. is 6.8 hours; on a hot summer day (100° F.) its half life is only 3.3 hours. However, the insecticide lasts long enough to do an efficient job of killing many agricultural pests, and its gradual disappearance minimizes food contamination.

STUMP ALCOHOL

Hydroabietyl alcohol, made from cheap, high-molecular-weight rosin acid, will contend for fatty alcohol markets.

THERE were suppressed whispers of excitement among the good people of Burlington, N. J. Surely those big concrete retaining walls going up at the new Hercules plant were designed for protection against atomic radiation; surely their town was going to be another Oak Ridge or Los Alamos.

The Burlingtonians, unfortunately for their melodramatic hopes, were wrong. Behind those barriers would be, not uranium, but plain, ordinary rosin. They also didn't know, nor much care, that the rosin would emerge from behind the barriers transformed into a viscous, water-clear alcohol—at the rate of several hundred thousand pounds a month.

But the new alcohol is calculated to make a splash in the chemical industry for two reasons: (1) it is versatile in its applications, both in itself and as an intermediate, and (2) it is cheap.

The One, Two Punch

It is actually a mixture of dehydro-, dihydro-, and tetrahydroabietyl alcohols, together with a small percentage of rosin methyl esters and hydrocarbons. The mixture is obtained by hydrogenolysis of methyl abietate.

Hercules Powder Co. started research on rosin alcohols back in 1933 and had a 2-lb.-per-hour pilot plant going in 1940. A full-scale plant was on the books for 1942, but the war intervened, postponing further development until recently.

Hercules felt safe in proceeding to full scale even before external markets were developed, for the company can utilize the material in its resins. But the physical and chemical properties of the alcohol are such that large and varied uses will undoubtedly develop.

It can be sulfated, for example, to a detergent; it can likewise be sulfonated, or combined with ethylene oxide to form a polyoxyethylene derivative. Oxidation to the aldehyde, amination to the amine, etherification (of particular interest: vinylation), esterification, halogenation, and nitration are a few of the other reactions it can undergo. Hercules already has the maleic, phthalic, and boric esters in the experimental stage.

Contender with Fatty Alcohols

It acts, without further modification, as a plasticizer for rubbers and polyamide resins; and it has also shown promise for sizing textiles and modifying waxes. In alkyd resins it improves brushing and gloss characteristics.

Hydroabietyl alcohol can do most of

the things fatty alcohols can do, and some things they can't. Especially significant from the standpoint of competition—in these days of high fat and oil prices—is the introductory price of the new alcohol: 20¢ per lb. in tank-car lots. It is reasonable to assume that capacity production will eventually bring the price even lower; but even at 20¢, the fatty alcohol market has a lusty new contender.

AMBITIOUS AEROSOLS

With I.C.C. regulations drafted, and container makers tooling up for mass production, insecticide packagers get ready for a boom.

THE "bug bomb" business started out, at least from a market researchers' viewpoint, with its left foot forward. For, although surveys have established that the low income groups are the largest users of insecticides, the first aerosols offered for retail sale were tagged at a neat $3.00. At such a price they appealed mainly to those in the higher income brackets, merely nudged the much broader mass market.

The high price was not, of course, unjustified. Production of the heavy steel "bombs" was expensive, and as many as 60 hand operations were required in the manufacture of the ready-for-sale item. However, the use of a strong and costly container was mandatory with the standard propellant, Freon 12. (This material, dichlorodifluoromethane, develops a gauge pressure of 70 pounds at 70° F., at 140° F. gauge pressure mounts to 200 pounds.) The real need was obvious: low pressure propellants and lighter, easily fabricated, cheaper containers.

An Objective Neared

Currently, the industry is pushing close to its objective. The major can makers, Continental, Crown and American, all have "beer can" bombs designed. Low pressure propellants have been created, will be available in larger quantities next year. Evident is the fact that next season will see the initial skirmishes in the low pressure aerosol battle.

Here is how the situation stands at the moment:

Millions in Mind

A few months ago the I. C. C. gave the go-ahead to aerosol packagers, laid down a specification which called for: (1) A non-flammable, non-poisonous propellant. (2) A container not to exceed 30 cubic inches, able to withstand 40 pounds gauge pressure at 70° F. and which will not leak or distort when the contents are heated to 130° F. This long-awaited directive gave both container makers and propellant producers a clear path to follow.

Can companies immediately pushed their research work, soon emerged with designs. This month both Crown Can and Continental Can are tooling up with "millions" of units in mind. American Can, although it has completed the design of several containers, has not as yet revealed its production plans.

On the propellant front, the odds are that Kinetic Chemicals Co. will have larger quantities of Freon 11 and Freon 12 available next year. General Chemical Co. is busy building a major plant for the manufacture of its Genetrons, expects that it will come in by mid-1948. That the new type "bug bomb" will be on the retail counters in the upcoming season there is no doubt: how many there will be will hinge in part on the steel plate situation and in part on the quantity of propellants which do become available.

What Price Level?

As yet, few will hazard an estimate as to what the price level of the new items will be. Some, and indeed most, manufacturers feel that $1.25 to $1.75 will be the tag on a 12 oz. bomb. A few, and a very few, expect that retail prices may be shaded to a dollar or slightly less. (The much-mooted 69c figure has now gone by the boards.) At this level, on a basis of insecticidal efficiency, the new products will compare fairly well with conventional fly sprays. Nevertheless, the odds are that they will never undersell oil-based sprays, and what manufacturers count on heavily is that the public will discount purchase price in favor of convenience.

One fact is evident: the heavy steel bombs will be crowded out of the household field by the lighter newcomers. (Some companies are already cutting back on output.) Significantly, many more companies will be in the aerosol business. At the moment, at least a dozen concerns are setting up shop as private brand packagers. In addition, naturally, other organizations now in the insecticide business, are planning their own packaging installations.

Substantial and Rapid Growth

Just how big a market will develop is another question which perplexes the industry. The conservative hope for total sales of 25 million units per year; others view 125 million as attainable. What it will actually be is, right now, anyone's guess. Nonetheless, it will be a substantial, rapid-growth market and the container makers, who regard aerosol insecticides as only the beginning and foresee sun tan lotions, other cosmetics and pharmaceuticals in similar packages, are tooling up for production runs far, far above 25 million units.

ROCKET LAB

The role of chemistry in national defense is emphasized in the Navy's new $10,000,000 rocket development laboratory.

ANOTHER milestone in the progress of the Navy's multi-million dollar rocket development program was passed last month with the completion of sprawling Michelson Laboratory at the U. S. Naval Ordnance Test Station at Inyokern, Calif. Its 250,000 sq. ft. of floor space make the new laboratory the largest under one roof devoted to developing and testing of rockets and evaluating rocket propellants.

Chemical Engines

Basically rockets are chemical engines, and the problems of making them operate at maximum efficiency under varying con-

OIL-BASE SPRAYS: To be nudged or crowded?

ditions are largely chemical. It is not surprising, therefore, that director L. T. E. Thompson has assigned the largest of the six wings of the new $7,000,000 building and a sizable portion of the $3,000,000 worth of equipment to the laboratory's chemical division. Headed by former Monsanto researcher Ross W. Moshier, this division is comprised at present of 38 chemists and chemical engineers. Its principal job is to conduct investigations which will lead to the improvement of the physical and chemical characteristics of materials used in rocket construction and to develop and test new compounds of possible value as explosives and propellants for rockets.

Assisting Dr. Moshier in supervising this work are three section chiefs: Dr. R. W. Van Dolah, formerly of the Wm. S. Merrell Co., Cincinnati, who heads the organic section; Dr. G. B. L. Smith, formerly professor of analytical chemistry at the Polytechnic Institute of Brooklyn, in charge of the inorganic section; and Dr. A. L. Olsen, former professor of physical chemistry at Kansas State College, who heads the physical chemistry section. Dr. Moshier himself handles a fourth section on analytical methods.

Lofty Ceilings

An unusual feature of about half of the laboratories in the chemistry wing of the new lab is the 16-ft. ceilings to accommodate tall equipment such as distillation columns. All of the laboratories are equipped with fluorescent lighting, soundproofing, and year-around air conditioning, as well as the usual utility facilities. At the end of the chemistry wing provision has been made for a two-story pilot plant where batches of several hundred pounds per day of test materials can be made.

Housed in the other five wings of the building are laboratories devoted to metals and their fabrication, electronics, photography, aerodynamics, and physics and optics. The main section of the structure contains administrative offices, library, conference rooms, and a cafeteria to accommodate 275 people. A large central shop is compltely equipped with all types of heavy machine tools, a 4,000-lb. tensile strength machine, heat treating furnaces, electroplating facilities, and three X-ray machines ranging from 100,000 to 1,000,000 volts.

The building itself is of an attractive modern design. It is constructed of poured concrete, two stories high in the main section and one story in the six wings and shop. Movable metal partitions are used between the individual offices and laboratories to give maximum flexibility along with substantial construction.

Desert Testing Ground

The Navy Test Station at Inyokern was first established in 1944 as the nucleus of the Navy's rocket development and testing program. Located in the eastern California desert between two ridges of mountains, it occupies an area approximately that of Rhode Island. It contains several test firing ranges for rockets, the largest covering a 40-mile expanse of level desert. Along the ranges are located spotting stations and various synchronized photographic devices for studying the missiles in flight. Total employment at the base is about 5,000 civilian and Navy personnel, who with their families make up a booming town of about 12,000 which three years ago was hardly a wide place in the desert highway.

Aside from its chemical interest, Inyokern is an impressive example of the role that science in general must play today in bulwarking a strong program of national defense.

FLEAS FLEE

An unconventional specialty, now being test-distributed, may well be the forerunner of a trend.

IN THE DAYS of David Harum the current philosophy was that, "A reasonable number of fleas is good fer a dog—keeps him from broodin' about bein' a dog." Whether or not that is true, from the dog's point of view, is, of course, an

G ALLEN MAIL: An old problem and a romping dog.

unanswerable question. But one thing is certain: the owners of the nation's 17 million dogs don't endorse the "let them have fleas" theory, and as a consequence a robust flea powder and flea soap business has come into being.

For some years, however, formulations have changed but little. The lion's share of the flea-control market has been held by rotenone-containing powders (usually up to five per cent rotenone and cube resins, 95 per cent talc or other inert). In only respect has there been any noticeable deviation from the old standard. Many formulators now include up to two per cent DDT in their powders, hope thereby to capitalize on the toxicant's residual effect.

Intriguing Advantages

But this month the makers of flea-eradicating specialties, and their chemical suppliers, were watching a new compound being test-distributed by Boyle-Midway, Inc. Tradenamed Ridz, and sold as a liquid, it appeared to offer many advantages not possessed by powders. It looked like an unconventional item, an item which might well be the forerunner of a trend.

Oddly enough, Ridz did not emerge directly from the research laboratory. Actually, it grew out of the home problems of G. Allen Mail, who used to live in tick-ridden Delaware County, Pa., now is Boyle-Midway's research entomologist. Day after day his dog romped home loaded down with the tick, *Dermacentor Variabalis*, which, incidentally is a vector of Rocky Mountain Spotted Fever. No standard remedy curbed the infestation, so last spring Mr. Mail concocted a 40 per cent chlordane emulsion, gave it to a veterinarian friend to try. That did it. The vet enthused. Ridz was added to the company's line of specialties.

The two features which most intrigue the trade are the prolonged residual effect which Ridz carries, and the high "convenience index" it enjoys. The toxic properties are, naturally, products of its formulation; the "convenience index" hinges on the fact that it is a liquid.

Application of a powder to a dog, particularly one of a long-haired breed such as a spaniel or collie, is a difficult and bothersome chore. Furthermore, unless the powder is applied thoroughly, the animal is not completely "de-flead" and re-infestation recurs promptly. The new compound, marketed as a pine-smelling black concentrate, is applied simply as a dilute solution. Recommended procedure: 1½ tablespoonfuls in a gallon of water to be applied as a post-bath rinse. If the solution is allowed to dry on the animal the toxicant will keep fleas away for at least two weeks.

At the moment, Ridz is being distributed in bulk only, and mainly to veterinarians. These animal specialists are using it for defleaing pets, delicing, controlling dog ticks, etc. (Some experiments have been conducted with cats, but the safety of such a practice has not been completely established.) Whether or not it will be small-packaged is another question which has not been settled as yet.

Nevertheless, more than 250 veterinarians are already trying the new compound, and many have submitted highly laudatory reports. Thus, some, at least, of the nation's dogs will be doing "more broodin'".

SULFONATE SERIES

Sulfonic acid plus another reactive group in the same molecule looks like a sure-fire combination.

ACETALDEHYDE disulfonic acid, $CH(SO_3H)_2CHO$, has several points to recommend it: First of all, sulfonic acid groups are perennial favorites among makers of wetting agents, cation-exchange resins, dyestuffs, and a host of other practical chemical materials. Second, the aldehyde group is notoriously eager to attach itself to any other reactive group that happens along. Third, the compound is potentially inexpensive.

The weight of this evidence was enough to convince General Chemical Division of Allied Chemical & Dye Corp. to investigate the product further and work out a feasible process of manufacture. A sizable binful of the hydrated potassium salt is now being made up for test-sample purposes, and offerings to the chemical public will be made shortly.

Jack-of-All-Fields

Acetaldehyde disulfonic acid undergoes all the usual aldehyde reactions, condensing with amino groups, aromatic rings, and common aldehyde reagents. It can be reduced to the alcohol, oxidized to the carboxylic acid, and halogenated.

Substituted for formaldehyde in phenol-formaldehyde resins, the product is promising for cation-exchange resins. The aliphatic sulfonates thus obtained are more stable than aromatic sulfonates.

Condensations with alkyl benzenes and alkyl naphthalenes are of particular interest for the synthesis of wetting agents. The aryl alkyl sulfonates thus obtained could not, of course, compete economically with the Nacconol or MP-189 types of detergents; but this reaction method allows the synthesis of special complex types where reactive groups (e.g., hydroxyl) are present on the aromatic nucleus.

Condensation products with phenols have also been patented as synthetic tanning agents, and some of the more promising derivatives are now being evaluated.

There are also, of course, the large fields of pharmaceutical and dyestuff synthesis, where every new compound has its day and some become permanent fixtures.

More in the Works

General's interest in sulfonic acids is not surprising, since the firm is neck-deep in sulfuric acid and other sulfur derivatives. Sulfuric acid is dirt cheap, and the profit per pound is slim; thus the effort of converting it to a salable intermediate is often well repaid.

Some of the new sulfonic acids come along during the war, when time for development couldn't be spared. Intensive study got under way last year, and acetaldehyde disulfonic acid is only the first of a series to hit the market.

Monochloroacetaldehyde disulfonic acid is very similar, but its potassium salt and derivatives are more water-soluble. The ethyl alcohol disulfonate, $HOCH_2CH(SO_3K)_2$, has an esterifiable hydroxyl group. Dipotassium methionate, $CH_2(SO_3K)_2$, has been patented as an intermediate in wetting-agent synthesis. All of these are still in the laboratory stage.

Infant mortality among new chemicals is high: Of the many products that reach the pilot plant, most die of indifference or neglect on the part of the hoped-for customers. So far, as concerns acetaldehyde disulfonic acid, General has met with no indifference.

ACRYLIC CONTENDER

Four-atom ring compounds aren't common among industrial chemicals, but a new one promises to go places.

A FEW YEARS ago the B. F. Goodrich Co. was looking for a new acrylonitrile process. Large quantities of that chemical were needed at the time for GR-A synthetic rubber, and a cheaper process was a sure path to the proverbial pot of gold.

TOM GRESHAM: Mousetrap-seekers beat a path.

One promising starting material was β-propiolactone, a four-member cyclic compound first described in 1915. Acrylonitrile could be made from it, true enough, but not cheaply; and so that approach was abandoned.

A Second Look

Later, when the pressure for immediate results was relieved, a different group of researchers, headed by Tom Gresham, took another look at β-propiolactone. Maybe it wasn't the answer for acrylonitrile, but it was an interesting compound in itself.

Potentially Cheap

Besides, it could be made cheaply. Back in 1915 a Swedish chemist, Johannson, made it from β-iodopropionic acid—a convenient laboratory route but obviously not a method for low-cost production. Goodrich chemists, under Frederick Küng, found they could make it from formaldehyde and ketone at a price which invited commercial exploitation.

Research was intensified. Chemists were set to studying its reactions; engineers worked on the process, found it applicable to large-scale output.

A Mousetrap Ready to Be Sprung

Four-member rings are under terrific tension, and they don't like it; they have been likened to mousetraps ready to be sprung. It is not surprising, then, that β-propiolactone reacts eagerly with a variety of chemicals. Even ordinary salt reacts with it to give β-chloropropionic acid. Sodium thiocyanate gives the β-thiocyano-acid; sodium cyanide, the β-cyano-acid; sodium acetate, the β-acetoxy acid. Phenols, mercaptans, halogen acids, water, alcohols, and thiourea also react with β-propiolactone to give β-substituted propionic acid derivatives. Ammonia and amines, however, give hydracrylamides, which lose water to form acrylamides. Acrylic acid derivatives can also be obtained from β-alkoxyproprionic esters by loss of alcohol and formation of a double bond in the α,β-position. These and many other reactions are possible with this reactive molecule.

Sell It or Use It?

After β-propiolactone had yielded up its secrets and the process for its manufacture had been worked out, B. F. Goodrich Chemical Co. took over. Immediately the company was faced with a policy puzzler: Should it sell the chemical as such or use it as an intermediate for the synthesis of other commercial compounds? The decision was to sell, for it was felt that the combined research staffs of several firms working independently would uncover more practical uses for the chemical than Goodrich's staff alone.

β-propiolactone isn't cheap yet; pilot-plant quantities are now selling for about $2 per lb. But Goodrich officials anticipate that the eventual volume price may be substantially less than 50c. Goodrich buys the formaldehyde and acetone, coverts the latter to ketene.

Already several samples have gone out to manufacturers. One is interested in plasticizers, another in acrylates. Indeed, at the expected ultimate price, processes based on β-propiolactone may well compete with existing production methods for a large variety of synthetic organics.

BRAGDON, FINHOLT and GIBB: Double bonds are indifferent.

HANDY HYDRIDE

Selective reduction of organic compounds has been advanced by a new chemical now going into large-scale output.

LITHIUM aluminum hydride can do what the beauty salons have been trying to do for years: reduce certain spots without touching others. Metal Hydrides, Inc., is sufficiently convinced of its ultimate importance that it is building a full-scale plant for the production of this new and unique tool for chemical synthesis.

It all started a short two years ago, when A. E. Finholt, working at the University of Chicago under Professor H. I. Schlesinger, discovered the compound and its method of synthesis in the summer of 1945. Thereafter, several researchers studied—and are still studying—lithium aluminum hydride at that institution. Professor Schlesinger is primarily concerned with its properties and inorganic applications; Professor Weldon G. Brown and his co-workers, with its organic uses. Dr. Finholt is now with Metal Hydrides.

Metal Hydrides saw its possibilities, developed a process during the spring and summer of this year. The research group which now includes A. E. Finholt, Thomas R. P. Gibb, Jr. and R. W. Bragdon, first made laboratory quantities; then the development group constructed an all-metal pilot plant; now a large-scale unit is being built.

Key to Its Excellence: Selectivity

Lithium aluminum hydride is a white to gray microcrystalline solid, soluble in solvents of the other type. Heat, water and ammonia react with $LiAlH_4$ to liberate hydrogen. Alcohols and amines also liberate hydrogen with the formation of the metal alkoxides and amides, respectively.

Most important, however, is the hydride's selective reducing action. Carbonyl groups of esters, ketones, aldehydes, acid anhydrides and acyl chlorides are reduced to the corresponding alcohol groups; nitriles, to amines; quinones, to hydroquinones; aryl nitro compounds, to azo compounds; alkyl halides, to hydrocarbons. But C=C double bonds are not generally attacked, so that selective reduction of functional groups in unsaturated compounds is possible.

There are many potential uses for the compound in synthesis of pharmaceuticals, perfumes, dyestuffs, and synthetic detergents; and if its cost can be lowered, it is expected that many large-scale uses will develop.

In the atomic field, $LiAlH_4$ shows considerable promise as a means of incorporating radioactive carbon into organic derivatives: it reduces $C^{14}O_2$ to formaldehyde or methanol.

Inorganic Uses, Too

Metallurgical and inorganic chemistry also stand to gain by the availability of the new hydride. Since it can be used to prepare a great number of volatile or easily decomposed hydrides, thermal decomposition of the latter may provide a means of coating objects with metallic films.

Raw materials for the product are lithium or lithium hydride, anhydrous aluminum chloride, and hydrogen. Ether is used as the solvent, and the reaction is carried out under an inert atmosphere. Large-scale manufacture presents obvious difficulties, most of which—Metal Hydrides says—appear to be solved.

The Outlook

Of what commercial use is the product right now? The best answer to that question is Faraday's classic reply: "What good is a newborn baby?" for lithium aluminum hydride is just that. Information on its uses is only currently being published in the academic journals. Thomas R. P. Gibb, Jr., director of Metal Hydride's chemical research, puts it this way, "This product is something new under the sun, and its unique properties are just beginning to be exploited."

THERMAL INHIBITIONS

A super-refractory, well along in the developmental stage, promises to be the answer to some perplexing industrial problems.

MANY A tyro ceramicist has looked at zirconia's physical and chemical properties and reached a hasty conclusion: here is the super-refractory which industry has long needed. At first glance, certainly, all the evidence points in that direction. But why has zirconia never attained the industrial stature it apparently deserves? Why has this oxide, with a melting point of 4900° F., is resistant to high temperature attack of many chemicals and metals, and is relatively plentiful, failed to capture a substantial share of the refractory business?

Deficiency to Overcome

There is, unfortunately, one good reason: zirconia, in spite of its super-heat resistance, is highly susceptible to thermal shock. Unless refractories made from it are heated and cooled very slowly they will crack and shatter. And this susceptibility to temperature variations appears to be an inherent characteristic of the oxide, for, at about 1000° C. zirconia inverts from the monoclinic to the tetragonal form, with consequent disastrous expansion changes. Were it not for this fact zirconia would be of considerably more robust commercial promise. However, could this deficiency not be overcome?

Off and on for over forty years zirconia has been subjected to research scrutiny, and much of the effort has been directed to the curbing of this crystalline inversion. Many theories have been propounded, many laboratory investigations have been carried through, but little of an immediately practiced nature has evolved. This month, however, scientists in the laboratories of Titanium Alloys Manufacturing Co. felt that they were approaching the long-sought goal. Now well along in the developmental stage, and due to be placed on the market next year, is a new TAM refractory composed essentially of inversion-inhibited, or "stabilized" zirconia. The secret: zirconia modified by means of small additions of lime and magnesia.

A Neglected Silicate

The study of zirconium compounds is not of course new, as far as TAM is concerned. During the past decade, for instance, the company, which mines zircon (zirconium silicate) in Australia (near Sidney) and Florida (near Jacksonville) has done much to transform this long-neglected silicate into an important industrial raw material. Zircon itself, incidentally, ranks well up on the

refractory scale, with a melting point of 4400°F. (higher thon any other common refractory except zirconia, magnesia, beryllia, and graphite). It suffers, however, from one major shortcoming: it cannot be used too satisfactorily above 3150°F., for, at higher temperatures silica is vaporized and permantently lost. Shock resistance, due partly to the zirconia formed, is thereby impoverished. Nevertheless, zircon has already gone far industrially. Today, 90 per cent of the aluminum produced in the U. S. emerges from zircon-lined furnaces, and a goodly share of sodium phosphate, calcium metaphosphate, and enamel frits are made in zircon-lined installations.

The Challenge

In spite of the acceptance of zircon, zirconia still presented a challenge, and when the Military issued its call for super-refractories (for rocket nd jet propulsion research) TAM pushed investigations of this refractory (in more than one sense) compound. Dozens of mixtures of zirconia and other oxides were examined, among them binary and ternary blends of ZrO_2 with lime, magnesia, ceria, beryllia and thoria. Some offered apparent advantages but with attendant shortcomings. Eventually it boiled down to the formulation on which the company is now pinning its hopes.

At the moment, officials are reticent about making expansive claims. They stress that the new product is still in the developmental stage, emphasize that the unique refractory is not available in quantity. As yet, indeed, all of the stabilized zirconia being shipped is tagged as experimental and company engineers are following field tests closely. This much they will acknowledge: test bars of stabilized zirconia subjected to 20 cycles of heating to 2800°F., with subsequent air blast quenching, have not failed. Regular zirconia can survive but a few such cycles.

Some Secret, Some Not

Furthermore, installations have been made which are operating successfully at 4200°F. Some of the applications, of military significance, are secret. Others are not, and, although TAM will not talk about it, one place where zirconia is scheduled to be evaluated is in the direct oxidation of nitrogen project being carried through by Food Machinery Corp. (CI Newsletter, May, 1947).

What about the prospects? Many applications are possible for stabilized zirconia, and among them are crucibles for melting special alloys, tubes for high temperature combustion and heat treating furnaces, kiln furniture and linings for high temperature chemical reaction chambers. In essence, a refractory having the good qualities of zircon plus the ability to withstand higher (and fluctuating) temperatures is now on the horizon.

The new refractory will not be cheap, will not compete with many conventional products. It is a material having special properties, adaptable to special uses, and refractory-wise its main competitors will be beryllia and thoria. Both of these latter oxides are, of course, far more costly and will not compete economically.

Whether TAM will push finished refractories, or concentrate on supplying stabilized zirconia to its refractory-making customers, is still undecided. However, the company regards itself as fundamentally in the raw material business, and the odds are that it will, as it did with zircon, etc., focus main attention on fundamental and applied research, the fruits of which will enhance the exploitation of zirconia.

CORN SIRUP COIL

Continuous conversion of corn starch to sirup shows cost and quality advantages over batch method.

THE manufacture of dextrose, sirups and allied products by acid hydrolysis of corn starch is at least a century-old industry in the United States. Throughout most of its history it has conducted its operations on a bulky batchwise basis.

Last month, however, two members of the chemical engineering staff of Corn Products Refining Co.—J. E. Dlouhy and A. Kott—presented a paper at the annual meeting of the American Institute of Chemical Engineers in Detroit describing for the first time a new continuous process which accomplishes the hydrolysis in a coil of several hundred feet of stainless steel pipe. Of additional interest is the fact that the process will be used in the new ultra-modern starch plant being constructed by Corn Products at Corpus Christi, Texas.

Investment Cut in Half

One of the principal advantages of the continuous reactor is that it costs but one-third to one-half as much as an equivalent batch reactor. Also, since the continuous system is entirely enclosed, it can be built outdoors if desired.

Although satisfactory products are obtained in both types of reactors, a more uniform material is claimed for the continuous process, especially in the low-purity ranges. Since the extent of the hydrolysis reaction is a function of time, temperature, and acid concentration, the proper choice of operating conditions can produce a number of hydrolysis coil products. Some of the results obtained in the continuous reactor are shown in the table below.

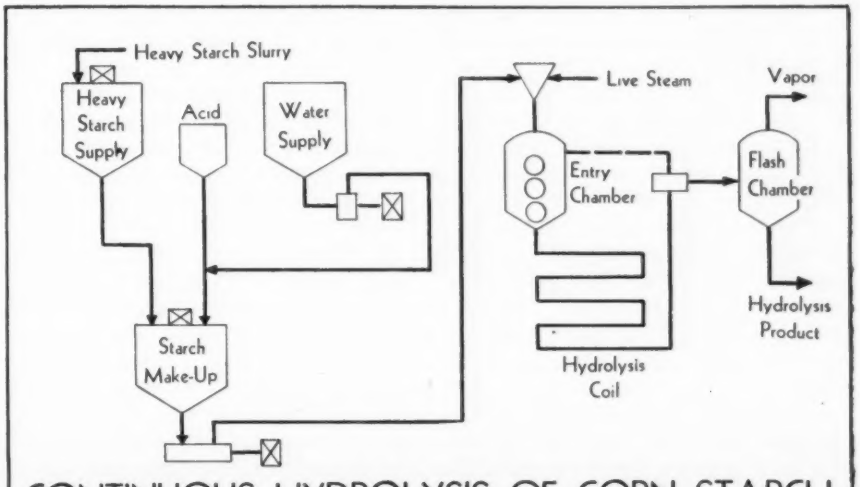
Process Steps

The steps involved in the continuous process are (a) procurement of the starch as a heavy slurry, (b) dilution of the slurry to operating gravity, (c) acidification of the slurry, (d) continuous hydrolysis and (e) flashing of the hydrolyzate.

Operation of the process can be summarized briefly by referring to the accompanying flowsheet. The high gravity starch slurry is continuously admitted into the makeup tank along with dilution water and acid. The adjusted slurry is pumped from the makeup tank to the hydrolysis system as a continuous stream. The slurry proceeds from the pump to a heater where steam is intimately mixed with the material to raise it to the desired temperature. The heater is mounted on top of an entry chamber. After passing through the entry chamber, the stream enters the hydrolysis coil, where the necessary holding time for the reaction is provided. A trap and level controller is located at the end of the coil, allowing for a continuous discharge of the hydrolyzate to a flash chamber where the pressure and temperature are reduced.

It has been found that best results are obtained from the process when starch gravity, acid normality, liquid level, flow rate, and reaction temperature are instrument controlled.

The pipe coil diameter selection is based on a minimum linear velocity of 0.4



CONTINUOUS HYDROLYSIS OF CORN STARCH

ft./sec. Length of the coil is based on holding time required for the desired proportion of products. Work has been done so far with 1¼-in. and 6-in. dia. pipe in the reactor coil, but 8-in. pipe is contemplated for Corpus Christi.

Results of Hydrolysis of Corn Starch in Continuous Reactor

Hydrolysis Coil Product	Normality of Acid Catalyst	Time in Coil (min.)	Temp. in Coil, °F.	% Dextrose Equivalent
Dextrose	0.030	18	316	90
Sirup	0.016	21	298	58
Sirup	0.016	26	287	42
Paste	0.010	19	287	16
Paste	0.007	16	270	5

MARINATED WOOD

Acetylation of wood with acetic anhydride and pyridine reduces shrinkage, doesn't impair strength.

THE ADVANTAGES of wood as a construction material are well known: it is light, strong, cheap, and easily worked. Its disadvantages, too, are universally recognized: it shrinks and swells with changes in humidity, for example, and it is readily attacked by various organisms.

As a result, groups interested in wood utilization are always casting about for techniques to overcome its drawbacks. One such group is the Forest Products Laboratory's Division of Derived Products, headed up by Alfred J. Stamm. A new process, developed by these researchers, looks like one of the more promising techniques for preventing dimensional changes and infestation by organisms.

Blocking the Hydroxyls

Wood's cellulose and lignin both contain free —OH groups in their structure, and it is these hydroxyl groups that are responsible for water absorption. One obvious method of preventing swelling of wood by water absorption is to "pre-swell' the wood with water-insoluble resins. The wood is impregnated with resin-forming material, which is then polymerized by heat; the wood is then left in a partly swollen condition because of the bulking action of the deposited resin. Impregnation with resins has been applied commercially.

The new process involves chemical blocking of the —OH groups by acetylation with acetic anhydride and pyridine. The pyridine not only catalyzes the acetylation, but also swells the wood to its permanent dimensions. The acetic anhydried then reacts with the hydroxyl groups, replacing them with bulkier, less hydrophilic acetyl groups.

The reaction is carried out in the vapor phase for reasons of economy; the same resistance to shrinkage (and the same acetyl content) is obtained with less of the reagents than in the liquid-phase reaction. Spruce so treated absorbed 50 per cent by weight of the acetic anhydride-pyridine vapors, gained 21 per cent in dry weight (acetyl content), swelled and shrank only 30 per cent as much as untreated spruce.

ALFRED J. STAMM: Never minds the weather.

An unlooked-for bonus is acetylated wood's superior resistance to destructive pests such as shipworms, termites and fungi. Test specimens of birch immersed in the Gulf of Mexico off the coast of Florida were unaffected after a year, while untreated control specimens were badly attacked by shipworms. Exposure to termite-ridden soil similarly failed to produce any damage in a year. Various fungi, which halved the weight of untreated balsa in 3 months, had no effect on an acetylated sample.

Other properties of the wood are not adversely affected by the treatment: natural color is unchanged, specific gravity is slightly increased, darkening in ultraviolet light is lessened, strength is unimpaired. Although hygroscopicity is reduced, the rate of moisture-vapor transmission is unaffected.

Not Commercial Yet

Although the process was first described over a year ago, no commercial application—so far as Laboratory officials are aware—has been made as yet. Cost data are not available at present, but they believe that the process is potentially cheaper than resin treatment. It would be difficult to apply on a small scale, however, because of the need for acid-resistant treating equipment.

Treatment has been limited to veneers of ⅛" thickness or less, for penetration into thicker pieces requires a prohibitive length of time. It has recently been discovered that the process is also applicable to non-delignified insulating boards. If the process is proved to be economically sound, wood and wood products may well find themselves in uses from which their weather sensitivity has heretofore excluded them.

RICKETTSIAL ROUT?

A new antibiotic, Chloromycetin, may prove to be the nemesis of rickettsial diseases such as Rocky Mountain spotted fever.

LAST summer public health authorities were deeply concerned over the inexorable spread of Rocky Mountain spotted fever to previously unaffected areas. This tick-borne fever, and the mysterious epidemic which swept through a large apartment building in the borough of Queens, New York City, a few months ago, are now known to be caused by a type of micro-organism known as rickettsiae.

The battle against rickettsiae has heretofore been waged without adequate weapons, but a new antibiotic, tentatively called Chloromycetin, may turn the tide of battle against these infections.

It Started in Caracas

The story started in a farmer's field near Caracas, Venezuela. A sample of soil from that field was found, by Paul Burkholder, of Yale's Osborn Botanical Laboratory, to contain an antibiotic remarkably effective against a variety of gram-negative bacteria and rickettsiae. Parke, Davis & Co. and the Army Medical Center became immediately aware of its potential importance, and preliminary reports by all three groups were published in the October 31 issue of *Science*.

The actinomycete produces the new antibiotic in aerated submerged cultures. A satisfactory medium consists of maltose, casamino acids, distillers' solubles and sodium chloride. Yields are as high as 85 mg. per liter of medium.

The antibiotic has been obtained in the form of pure crystals by a procedure involving extraction, chromatographic separation, and crystallization. Analysis gives an empirical formula, $C_{11}H_{12}O_5N_2Cl_2$. The compound is neutral, sparingly soluble (2.5 grams per liter) in water, and stable to 5 hours' boiling in distilled water.

The Mice Stayed Alive

The antibiotic showed up heroically *in vitro*, but even more persuasive were the experiments conducted on mice inoculated with a rickettsial infection. The eight untreated mice all died the eight which received 1.5 mg. each per day of chloromycetin all lived! Several subsequent experiments told the same story; and they proved, moreover, that the therapeutic agent was non-toxic and could be taken orally with good results.

Very significantly, similar results were obtained with mice infected by a strain of psittacosis (parrot fever), a dread virus infection. This is one disease which has been proposed as a weapon of biological warfare, since there was no known counter-agent.

It must be emphasized that the work done to date with chloromycetin is sketchy. But if further research upholds its early promise, mankind will have another strong right arm for its never-ending battle against death.

CARTESIAN MANOSTAT

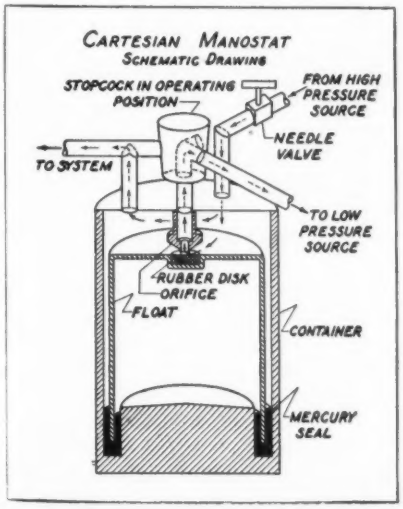
In this new highly-sensitive pressure control, a medieval physics experiment finds its first job in industry.

WHAT graduate of high school physics does not remember the Cartesian diver, that tiny inverted tube carrying entrapped air that traveled down or up a column of water with a slight increase or decrease of pressure on the column? This mechanism attributed to the 16th century scientist Rene Descartes, is now being employed for the first time industrially in a new automatic constant-pressure control which achieves an accuracy of 0.1% on pressures from 0 to 100 psi absolute.

Although the Cartesian device is known to have been used by an Englishman named Caswell as early as 1704 to make a high-sensitivity barometer, it remained for a group under the late Dr. Frank C. Whitmore at Pennsylvania State College in 1938 to work out the first application for pressure control. Based on the work at Penn State, the Emil Greiner Co. of New York introduced in 1940 the first commercial unit in the form of a glass laboratory model. The use of glass as a material of construction, however, imposed several limitations as to the pressures at which the device could be employed. As a result the Greiner engineers have developed the new industrial model, which is made of stainless steel and plated steel and brass.

How It Works

The method of operation of the manostat may be briefly described with the aid of the accompanying schematic drawing.



CARTESIAN MANOSTAT: Descartes' diver finds a job.

For vacuum operation the stopcock is turned so that the gases are evacuated from the system and from under the float through the mercury seal. When the approximate vacuum is reached the stopcock is turned to the operating position, in which gas can be evacuated from the system through the orifice only. The exact pressure desired is obtained by raising or lowering the orifice.

A small leak into the system, which is controlled by a needle valve, causes the pressure to rise very slightly and depress the mercury level outside the float, which in turn compresses the gas inside the float and causes the float to lower. This opens the orifice and enables the vacuum source to remove the excess pressure. So long as the leak into the system does not exceed the capacity of the orifice and pumping system, the pressure is maintained with a precision of the order of 0.1%.

Operation for pressures greater than atmospheric is similar except that during the period of bringing the system to equilibrium gas is forced inside the float instead of evacuated. After turning the stopcock to the operating position, the leak into the system from the high pressure source is adjusted so as not to exceed the capacity of the orifice, which may be connected to the atmosphere or some other low pressure source.

OIL PROPHECY

The current high demand for oil may spring the economic lock on synthetic liquid fuels.

UNLIKE synthetic rubber, it isn't likely to take a war to put a synthetic liquid fuels industry on its feet in this country, in the opinion of W. C. Schroeder, chief of the Office of Synthetic Liquid Fuels, Bureau of Mines. Skyrocketing peacetime demand may do the job very nicely without any outside help, Dr. Schroeder told members of the American Institute of Chemical Engineers at Detroit last month. The picture as he sees it is this:

Discovery of new reserves since 1938 has been at a rate equal to only about half the rate of consumption during the same period. This is despite the fact that exploration activities were 3 or 4 times as great in 1946 and 1947 as before the war.

U. S. consumption of oil has increased from 4 million barrels a day before the war to 5 million barrels a day during the war to 5½ million barrels a day in 1947. In the event of another war it would probably rise to 8 million barrels a day.

The U. S. will get no material amount of oil from the Persian Gulf area before 1951, and it is anybody's guess how much it will get after 1951.

W. C. SCHROEDER: For 9 billion dollars, a synthetic oil industry.

The question before us, according to Dr. Schroeder, is not can we find other sources of oil, but rather which of the other sources shall we use. Secondary recovery methods from sand, undersea drilling on the continental shelf, working of tar sands, synthesis fro mnatural gas, all are in various stages of development. Oil shale offers a source of petroleum with reserves about four times our known crude oil reserves.

"But the really vast source of oil is coal. The United States is thought to possess 50% of the known supply, and the methods are available for converting it to liquid fuels. If coal is used to supply the amounts needed for all combustion and heating purposes the reserves will be sufficient to last for hundreds of years."

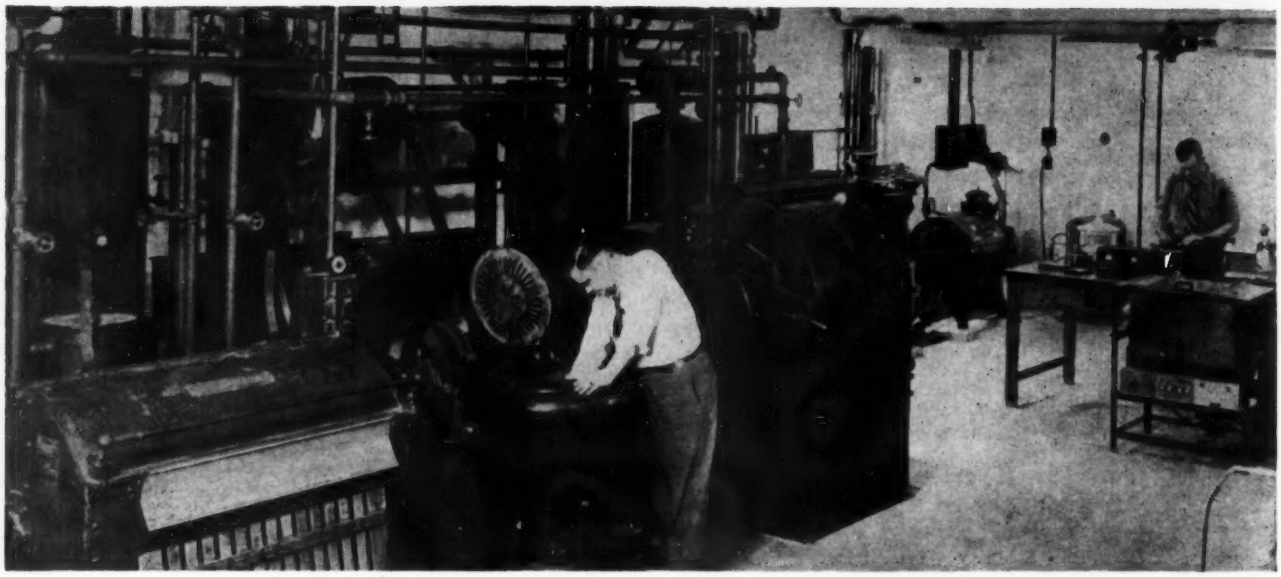
Dr. Schroeder's estimate of the investment needed to produce 2 million barrels of oil a day from synthetic sources: "8 or 9 million dollars and perhaps 15 million tons of steel."

BETTER THAN DDT?

During the past 18 months American Cyanamid Co.'s entomologists have been beaver-busy evaluating hundreds of new compounds which they hoped might hold insecticidal promise. And this month they revealed one of their discoveries, which has been tradenamed Thiophos 3422 and is due to be made in commercial quantities by early January.

Chemically, the new compound is O, O-diethyl O-p-nitrophenyl thiophosphate—a yellow liquid, soluble in water only to the extent of about 20 ppm, but readily dissolved in a wide range of esters, alcohols, and aromatic hydrocarbons.

Insecticidally, the new product—according to the company's tests and those of 75 experimental stations — is effective against many types of pests. The markets to be cultivated first: apple mite control, vegetable crops, shade-grown tobacco.



THE DRY CLEANING INDUSTRY

Offers New Services, Requires New Chemicals

by LEROY H. MANTELL,
Office of Domestic Commerce,
Department of Commerce

WITH CHEMICAL NEEDS INCREASING both in quantity and variety, the dry cleaning industry now ranks well as a chemical consumer. And not to be overlooked are recent developments—water repellent finishes, mothproofing and fireproofing—all of which enhance the industry's prospects.

INCREASING urbanization and greater purchasing power have meant more business than ever before for dry cleaning establishments. Average sales per plant in 1945 jumped 116 per cent over the 1938 level (according to reports received by the National Institute of Cleaners and Dyers) and personal expenditures for cleaning, dyeing, pressing and allied services reached a record high of $767 million in 1946, according to Department of Commerce estimates. The latter figure is more than twice the prewar estimates for this type of service and certainly an important measure to be considered by manufacturers of chemical products serving the dry cleaning industry.

CHARACTER OF THE INDUSTRY

The modern dry cleaning industry is composed of several types of concerns which differ in the kind of work they do, the services they perform, and the techniques they use.

The first type, and probably the one with which people are most familiar, is the small, neighborhood tailor or press shop. Here the work is left by the customer and the proprietor of the store sends it (at so much per garment or per pound) to a large wholesale dry cleaning plant for rough cleaning. It is returned, usually in bundles or bales, to the store where possibly spots and stains are removed and the garments pressed for final delivery to the customer. The amount of this work which dry cleaning plants handle is not of significant proportions—on the average it does not exceed 6 per cent and in 1945 comprised only 4 per cent of the total sales.

The wholesale dry cleaning plant is usually located in the industrial area of a community. It is fully equipped with power-operated, washer-type machines for dry cleaning and uses a petroleum solvent. The operator of such a plant has agreements with many small shops of the tailor or press type whereby his trucks call regularly and pick up bundles of garments. Some dry cleaning plants, in addition to doing wholesale work for tailor shops and press shops, operate stores or maintain delivery routes of their own.

The chain store cash-and-carry dry cleaning organization is usually composed of a big central plant and operates retail stores in strategic locations throughout the city—in addition to handling a general wholesale business. These organizations do not rely on routes to pick up and deliver cleaning at the homes of customers but operate numerous stores to which customers bring their garments and call for the finished articles. In 1938, sales through these chain stores, reported by the National Association of Dyers and Cleaners, averaged over 12 per cent of the total dry cleaning sales, rising to a high of 24 per cent in 1943 but falling off to 19.5 per cent in 1945. Generally speaking, this type of organization comprises a more important part of total sales than do the sales from press and tailor shops.

TYPICAL OF TRADE

The delivery type of dry cleaner is usually regarded by members of the industry as being typical of the trade. His is a completely power-operated, machine-equipped plant. It has all the facilities for doing cleaning, spotting, and pressing. He utilizes route salesmen for extending personal service, but some work is brought in and called for by the customer. Business done by route salesmen, otherwise known as call-and-deliver sales,

form the bulk of the business of dry cleaning establishments. In 1938, call-and-delivery sales represented 77 per cent of the total done, declining through the years to approximately 52 per cent in 1945. Plant retail sales, however, increased rather steadily from a low of 7.6 per cent in 1938 to almost 25 per cent in 1945.

IMPORTANCE OF SMALL UNITS

Before the war about one-third of the cleaning plants in the United States were equipped to use one or another of the synthetic cleaning fluids. The 2- or 3-man retail solvent cleaning plant is generally of this type and has a very definite place in the industry although their sales accounted for less than one-third of the total volume of the cleaning business.

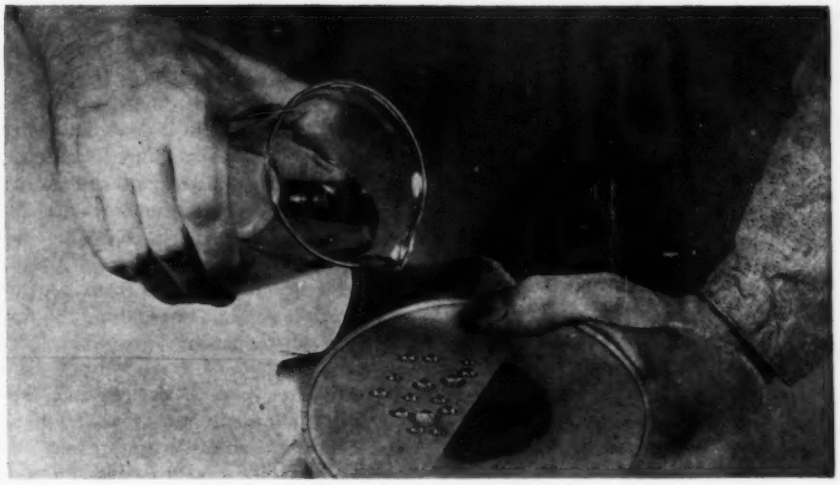
A synthetic solvent plant can be set up in a space smaller than that required by one using petroleum fluid. Because of the resultant reduced fire hazards, synthetic plants are sometimes able to locate in areas forbidden to petroleum plants. Contrary to most expectations, the small plant is generally able to conduct its business as efficiently, from a price standpoint, as the large plant operated on a petroleum basis.

During 1945, plants doing an average volume of $25,000 a year or less operated at a net profit of 17.4 per cent, about 6 per cent of sales higher than the more than $300,000-per-year group. While the production costs for the small plant were generally 10 to 12 per cent of sales higher than the larger plant, its selling and distribution costs percentage-wise were a great deal less—averaging slightly over 6 per cent of sales in 1945 as compared with 20 per cent and 24 per cent for plants in the $300,000-per-year category. Office and administrative expenses were relatively high irrespective of size of plant.

Quite naturally most of the business done by small plants is at retail and is derived from regular patrons and passers-by. Call-and-delivery business is a relatively lesser amount averaging about 36 per cent of total sales as against 64 per cent for plant retail business. The larger plants placed increasing emphasis upon call-and-delivery business and also upon branch store-business which came in for its share of total sales. By comparison the percentage of business done on a plant retail basis decreased markedly as size of firm increased.

SOLVENTS USED

Approximately two-thirds of the cleaning plants in the United States use petroleum solvents, the most popular of which is Stoddard solvent. In 1942 the dry cleaning industry, it is estimated, used 53 million gallons of petroleum solvent of the Stoddard type. This special petroleum distillate has a minimum flash point of 40°C (100°F.) in a closed cup tester. About 20 years ago it replaced more hazardous gasoline or naphtha. Its boiling range of from 100° to 200°C places it between naphtha and kerosene.



An extra rinse, to render fabrics water repellent, yields dry cleaners a premium price, broadens chemical needs. Among the more popular treatments: wax-base specialties, such as Drax.

Recently, a petroleum solvent with a minimum flash point of 140°F has become available. It has a higher initial boiling point than Stoddard solvent and is readily removed in deodorization—a prime requisite of any organic solvent used in dry cleaning.

Carbon tetrachloride, perchlorethylene and trichlorethylene are the chlorinated solvents in widest use. Generally one of these solvents is used in the cleaning drum, however they may be mixed with ethylene chloride or benzol.

Among these synthetics carbon tetrachloride has received the largest favor with 42 million pounds being consumed by the industry in 1942. It has a wide range of solvent power and garments treated with it are free from odor in a few minutes. This very volatility has caused some dissatisfaction in dry cleaning circles since it makes application somewhat difficult. In addition the constant escape of fumes, toxic in any volume, and its corrosive action, has caused a rather recent trend toward increasing use of perchloroethylene. In 1942, the industry consumed 5 million pounds of perchloroethylene as against 2½ million pounds of trichloroethylene (which is not as widely used even though it does have many advantages from the standpoint of cleaning efficiency, stability and lower toxicity). The prime cause for its unpopularity is its tendency to cause the dyes in many cellulose acetate fabrics to bleed, especially when it is warm.

The use of carbon tetrachloride constitutes no fire hazard but it is quite unstable in the presence of light and moisture thus creating a problem in maintaining correct formulations while in process. The industry has become acutely aware of this and is conducting experi-

Chemicals Used by Dry Cleaners

Chemical	Unit	1942 consumption: Amount (thousands)	1942 consumption: Price	1942 consumption: Cost	Estimated 1946 dollar consumption
Petroleum	gal.	43,000	.12	$6,360,000	$8,885,460
Carbon tetrachloride	lb.	42,000	.05[a]	2,100,000	2,933,870
Perchlorethylene	lb.	5,000	[b]	[b]	
Trichlorethylene	lb.	2,500	[b]	[b]	
Ethylene dichloride	lb.	2,500	[b]	[b]	
Wet cleaning soap	lb.	7,200	.16	$1,152,000	1,609,000
Sodium perborate	lb.	750	.22	165,000	231,000
Sodium chloride	lb.	720	.0087	6,264	8,000
Hypochlorite bleach	lb.	35	.15	5,250	7,000
Hydrosulfite stripper	lb.	175	.40	70,000	98,000
Acetic acid 28 percent	gal.	360	.35	126,000	176,000
Ammonia	gal.	200	.90	180,000	251,000
Alcohol	gal.	150	.55	82,500	115,000
Sulphated alcohols	gal.	360	1.00	360,000	503,000
Dry cleaning soaps	lb.	28,800	.15	4,320,000	6,035,000
Prespotters	gal.	720	1.95	1,404,000	1,961,000
Caustic soda potash	lb.	1,000	.035	35,000	49,000
Benzol	gal.	75	.90	67,500	93,000
Amyl acetate	gal.	60	2.75	165,000	231,000
Filter powder	lb.	21,600	.029	626,400	875,100
Activated carbon	lb.	750	.20	150,000	209,562
Paradichlorobenzine flakes	lb.	30	.10	3,000	4,191
Dyestuffs	lb.	1,000	1.10	1,110,000	1,550,765
				$18,487,914	$25,825,948

[a] *Wholesale drum lots price secured from Bureau of Labor Statistics.*
[b] *Not available.*
NOTE: *Additional supplies, while minor in quantity, are extremely important and depend to some extent upon local conditions. Among these are lactic acid, acetone, ether and storage fumigants.*

ments at the National Institute of Cleaning and Dyeing in Silver Spring, Maryland, to determine the exact relationship between moisture content of garments, air humidity and cleansing action. The excess moisture in garments must be controlled more carefully in processes using carbon tetrachloride than using petroleum solvents although the latter also is subject to a degree to the adverse effect of air humidity upon soaps carried in the solvent. The propensity for moisture absorption on the part of materials awaiting processing means that the quality of the work will suffer unless humidity control is exercised. Wrinkling and shrinkage are two commonly resulting complaints. On the other hand a relatively low humidity will cause greying owing to redeposition of soil in the processed clothing. While no exact data are available, tests conducted by the Institute appear to favor a range of 50 to 65 percent humidity as best for dry cleaning.

DRYCLEANING SOAPS

In 1942 the dry cleaning industry consumed 28.8 million pounds of dry cleaning soaps, representing over half of the industry's total consumption of all types of soaps and chemicals. The importance of soaps cannot be underemphasized since their use varies directly with the amount of work taken in. The most common ratio governing the use of dry cleaning soaps is ½ ounce to every pound of fabric processed. Most cleaners spend at least ½ per cent of sales annually for soaps and detergents.

An ideal dry cleaning soap should be capable of cleansing all kinds of textile materials without injurious effect on fibers or dyes. It should be readily miscible with the solvent used, whether Stoddard or synthetic; leave no deposit on the fabric; be odorless and be capable of complete removal from the solvent in distillation of filtering. A further and more important qualification would be its ability to clean both insoluble soil and water-imparted stains.

The dry cleaning soaps used in this country as a mixture of soap and a free fatty acid such as oleic. Mahogany sulfonates may also be used as a detergent—as can any good wetting agent if it is miscible in an organic solvent without unduly building up filter pressure. In general, these superfatted soaps prepared in a gasoline vehicle, are soaps in which the fatty acid has not been completely saponified by alkali. They are only partly soluble in the organic solvent but are capable of good dispersion. Partial saponification is essential where no blending agent is used.

Recent work by S. R. Palit, outlined in a paper presented at the ninteenth annual fall meeting of the American Oil Chemists' Society, indicates that ordinary neutral soap can be dissolved in hydrocarbons by the use of suitable agents. Essentially Palit's method involves dissolving a commercial soap in dibutyl tartrate containing 20 per cent benzene or trichlorethylene. The 30 per cent soap solution so prepared is diluted with vegetable or mineral oil to make a final soap concentration of about 3 to 5 per cent, which can be thinned out with water to form a very stable emulsion. The important feature is that any of the dry cleaning fluids can be substituted for the vegetable or mineral oil without precipitation of the soap. The resulting solution is reported to possess good detergent power.

Apart from general dry cleaning accomplished through mechanical tumblers and complete immersion in organic solvent, a very important part of the dry

More than $4 million worth of special detergents are used by the industry annually.

cleaning process is individual spot removal. Sometimes this is known as prespotting, since, for purposes of efficiency, it may precede the general cleaning process. It is in spot removal that the dry cleaning industry calls upon a wide variety of solvents ranging from acetic acid to amyl acetate.

Since many water soluble stains are capable of removal by an all-purpose agent, the so-called "general formula" has been developed. This agent can be used with water to remove ink and tannin stains, berry, lipstick and dyestuff stains but is not effective on paint, oil, grease and wax stains.

The general formula, according to Institute specification, may consist of the following:

½ part glacial acetic acid 99%
1 part synthetic methanol
½ part oxalic acid crystals by weight
1 part lactic acid
1 part amyl acetate CP

When the oxalic acid is dissolved, add four parts glycerin. Next add enough butyl alcohol to make a clear solution, usually about one part. If upon formulation it is found that cellulose acetate rayon is affected, glycerin should be added until this condition is remedied. The general formula is, of course, exclusively for use with water.

There are also a number of "wet spotters" which act equally well with all types of stains and possess good solvent characteristics under wet and dry conditions. They are capable of removing not only the types of stains mentioned above, but also soil, paints, oils, and greases (using water as a rinsing agent). A suggested formula, according to the Institute, is:

6 parts castile soap
1 part water
1 part ethyl acetate
1 part chloroform
1 part acetane
1 part synthetic methanol

For wet spotting, very often pyridine with soap is used in a 1:9 concentration by volume. Pyridine with oleic acid in the same proportion can be used for dry spotting. These formulations are of use in removing small dye spots from fabrics (other than cellulose acetate rayon) without bleaching.

The use of digestive agents in spotting while not exactly new, is only now becoming relatively wide-spread as a technique in dry cleaning. In the digestive agents manufactured for spotting purposes, mixtures of various enzymes are used in order to make them effective on sugars, starches and albuminous materials.

NEW SERVICES, NEW CHEMICALS

There are several developments in the range of services offered by the dry cleaning industry which have received considerable impetus during the war. Probably the most well known of these ancillary services is termed variously "water - proofing," "rain - proofing," "shower-proofing," "water repellent" and "water-resistant."

These conflicting and overlapping terms can be reduced for clarity to two distinct types, namely, water-repellent and water-resistant. Water repellency in cloth implies a complete plugging (generally with a wax) of the interstices of the weave or "pores." Water-resistant fabric, on the other hand, leaves the interstices open so that the cloth can "breathe" and therefore be used as clothing.

Some fabrics take water-resistant treatment better than others depending upon general conditions, the first of which is the construction of the fabric. A tightly knit, smooth finish material such as poplin will permit a high degree of water repellency. Secondly, the condition of the fabric, whether new or old, and lastly the type of fiber in the cloth, are of importance. Cotton retains more solvent during extraction in the finishing

process than does wool and is more likely to achieve a higher degree of repellency. Where a separate dip tank is used, the carrier is more than likely to be Stoddard solvent. Where water-repellency is to be achieved after wet-cleaning, the wax takes the form of an emulsion in aluminum formate.

Water repellency of leather goods is also possible to some extent by the use of a methyl methacrylate-base compound as a finishing agent. This imparts a high gloss to the leather and restores pliability to a large extent.

MOTHPROOFING

Mothproofing as a dry cleaner's service is a recently developed procedure which has received a good deal of publicity. (See Feb. 1947 CHEM. IND. *"DDT for Mothproofing"*). In addition to the highly potent DDT mixtures other products included in the "dip" category appear to be satisfactory where the garment is absolutely clean. Minute oil or grease spots preventing complete impregnation may defeat efforts to mothproof completely.

As contrasted with the "dip" type compounds, other products are sprayed on after cleaning. According to trade reports the industry favors the dip type because of the more complete penetration achieved. (See CHEM. IND. May 1947).

Probably the best type of mothproofing agent, from the dry cleaner's standpoint, is a fluoride-base compound which can be utilized in water solution. The solution is added to the solvent, with an emulsifier, and clothes or material to be mothproofed immersed. The fabrics, by their nature, absorb all water in the mixture, leave the solvent clear and dry and are mothproofed in the process.

Widely publicized and disastrous fires in public gathering places during the past few years have served to arouse considerable interest in the flameproofing of fabrics. Dry cleaners' customers are requesting that household articles such as bedspreads, furniture covers and draperies be made fire resistant and some State legislatures have enacted laws requiring the use of flameproof curtains and draperies in night clubs, theaters, schools and similar public meeting places.

Dozens of chemicals, in smaller quantities, are consumed in removing stains and spots.

It is important to remember that a textile fabric which has been *flameproofed* is not *fireproof*, as is asbestos.

Characteristics of a good flameproofing compound have been outlined by the Institute as follows:

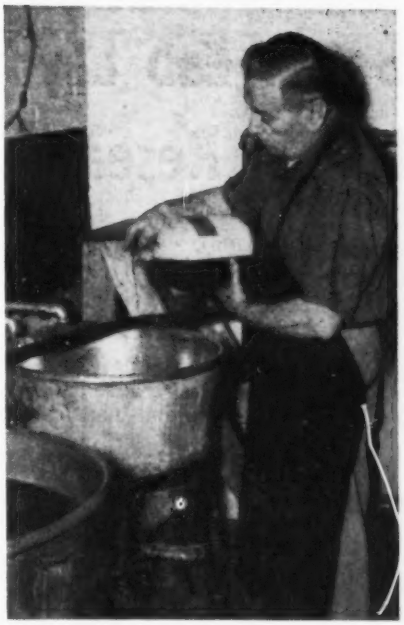
1. Treatment should not make the fabric excessively acid or alkaline as this weakens fibers.
2. It should not affect the fabric color.
3. It should not be hygroscopic to the extent that the treated fabric feels damp. This may cause the fabric to hang badly, hasten chemical deterioration and encourage mildew.

There are a number of trademarked products on the market which give varying degrees of flameproof qualities to fabrics, but certain common compounds may be used with equally good results. Tests carried out by the Institute of Cleaning and Dyeing indicate that borax-boric acid in a 1 pound per gallon of water concentration gives excellent results with either dip or spray application. The ratio of borax to boric acid used is 7 to 3. Slight heating may be necessary in order to bring about complete solution. Other compounds yielding good results were found to be sodium tungstate in a 1½ pound per gallon solution and diammonium phosphate in a 1 pound per gallon solution. It is important to remember in connection with flameproofing that subsequent wet cleaning will generally remove any product which has been used (necessitating retreatment), while dry cleaned fabric may or may not require retreatment.

EXTENT OF THE MARKET

In various sections of this article mention has been made of 1942 estimates of chemical, soap and solvent consumption by the dry cleaning industry. These were originally prepared by the Research Staff of the Institute of Cleaning and Dyeing and have been here projected to approximate a 1946 consumption estimate. The basic assumption in deriving this estimate has been that the use of all materials is directly proportionate to total demand for dry cleaning services. This is open to certain objections, especially in the case of the estimates for carbon tetrachloride, because of the tendency in the industry to greater use of perchlorethylene.

The accompanying table shows 1942 estimates as compiled by the Institute, together with 1946 projections prepared by the author.



Wetting agents are important so that redyed garments will have fast, bright colors.

It is rather difficult to make any generalization as to future prospects of the dry cleaning industry as a market for chemicals and chemical products since most projections of a statistical nature are based upon the historical method. The recent war gave the dry cleaning industry considerable impetus as it did nearly all forms of personal service. Dry cleaning, however, received a stimulus not alone as the result of increased civilian income but also as an outgrowth of the increase in the armed forces. Soldiers, sailors and marines, not to mention the distaff side of the services, brought increased volume to cities located near posts, camps, stations and air fields. The net result is to place on unsure ground any relationship between dry cleaners' receipts and indices of income or consumption based on wartime data.

THE OUTLOOK

However, some indications of market potentials can be constructed on the basis of prewar data, which will be useful in sales programming. The procedure with which most market analysts are familiar is a simple statistical relationship between disposable personal income (income that people have to spend), total dry cleaners' receipts as evidenced by personal expenditures for dry cleaning service, and average per cent of sales spent by dry cleaners for materials, soaps, chemicals and solvents.

The first and second factors can be obtained from data published in the Department of Commerce Survey of Current Business (See July 1947 *National Income Supplement*). The last factor can be found in reports prepared by the National Institute of Cleaning and Dyeing, Silver Spring, Md. and reprinted by the Marketing Division, U. S. Department of Commerce for free distribution.

Better Lab Layout, Higher Research Output

by E. G. ROCHOW,* Chemical Department,
General Electric Company
Schenectady, N. Y.

EVEN MODERN INDUSTRIAL LABORATORIES, the author believes, reveal a great deal of horse-and-buggy thinking. It is management's job to become acquainted with progressive ideas, act upon them in the planning of new facilities, and thereby increase research productivity.

RESEARCH laboratories primarily are aggregations of people who work in a field of common interest. Nevertheless, the equipment with which they work and the disposition of that equipment in the available space can have much to do with the amount and the quality of the work turned out. Even more important, the extent to which the laboratory workers can consult without getting in each other's way must influence greatly the degree of cooperation which results. From the patent standpoint, it is imperative that workers be in a position to observe and to understand each other's experiments, so that they may corroborate the inventor of a new process. These considerations lead to some generalizations which apply to all chemical laboratories, even though special circumstances alter the individual result. It also seems evident that care taken in the design of an industrial laboratory will be repaid in money as well as in satisfaction.

The following paragraphs represent one point of view on laboratory layout, a view concerned principally with the emerging unit laboratory as a desirable workshop for research. This is not to say that other schemes are undesirable or intolerable; many which are at variance with the concept of unit space will continue to supply satisfactory working space. This article is concerned more with improving upon the "satisfactory" arrangements. It begins with the opinion that an opportunity to plan a new laboratory room or a new building represents an opportunity to try something new rather than just to copy something that has been built before and found to be reasonably satisfactory. Every laboratory becomes out-of-date in about one generation, even though the building and equipment are kept in perfect condition, because our standards constantly change. This rapid obsolescence makes it desirable to plan ahead, so that a new laboratory may be at least contemporary, or preferably a little ahead of its time. By so doing, the useful life of the laboratory will be extended and the convenience and pleasure of its occupants will be maintained on a higher level throughout these years.

EVOLUTION OF THE UNIT LABORATORY

It has long been traditional in high schools and colleges to equip a laboratory for elementary instruction with long rectangular tables in the center of the room and a few fume hoods along the wall of the room, this arrangement being the most economical of space and being quite satisfactory for the rather short periods of instruction during which the young and resilient student is expected to stand at his table. This arrangement carries in the memory of the student to whatever career he undertakes, so it is not surprising that most research laboratories bear a surprising resemblance to each other and to the old school laboratories.

In advanced research laboratories, there has been a gradual rearrangement of the familiar rectangular tables in order to bring within the reach of the individual research worker enough space and facilities for the more complicated and lengthier experiments which his work requires (Figure 1). For example, the straight-line sequence of desk-table-sink may be broken to form an L-shaped or U-shaped arrangement, in order to reduce the day's mileage.

The later variations show recognition of the idea that each research worker should have his own work space to use as he sees fit. As this space is "wrapped around" him to a greater and greater extent, and facilities like a hood and sink are brought to him instead of being shared in some other part of the room, the unit laboratory idea begins to emerge. The shape is in itself not as important as the combination of work table, cupboards, sink, hood, and writing table laid out as a unit for each worker. These facilities he may then use according to his habits of neatness or disorder, without interfering with others and outside the stream of traffic. Examples of such arrangement are given in "Laboratory Construction & Equipment."[1] The T-shaped arrangement has even been extended to some high-school laboratories (Ref. 1, fig. 72).

The examples which have been given do not provide the following simple necessities:

(1) Adequate handy storage space for everything not in immediate use.

(2) Enough clear work space within reach of a person conducting several experiments at once.

(3) Provision for use of a microscope or other optical tools.

(4) An individual sink within handy reach.

(5) Eye-level reagent shelves.

(6) Racks for floor-to-ceiling installations such as tall stills, etc.

In fact, it has recently been said that, "Even the modern chemical work benches are very inefficient, and are designed with more consideration for economy in space and manufacturing than for conservation of the chemist's time and energy. By proper design, savings of twenty-nine per cent in time and seventy-two per cent in steps have been realized in comparable types of work. The manufacturer of chemical laboratory furniture who dares to base design on a motion study with complete disregard for precedent, should find potent sales arguments."[2] Add to this basic inefficiency a general impression of dreariness in the laboratories of the past, and it can be seen why drastic changes are on the way.

THE IDEAL UNIT LABORATORY

Laboratory layout in even the newest college buildings is never absolutely functional, being limited by the architectural pattern of the building as well as by the traditional furniture available from manu-

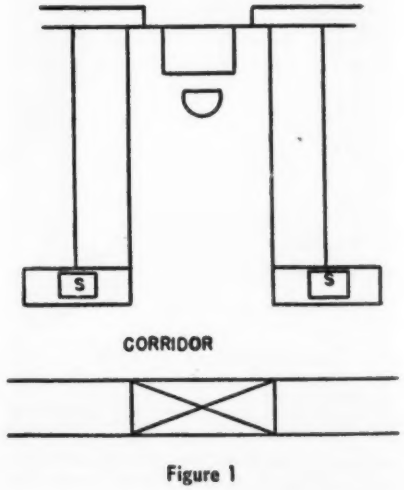


Figure 1

* Based on a talk given by Dr. Rochow before the Stamford Professional Group of Alpha Chi Sigma.

facturers. By starting with the basic idea of an efficient and pleasant unit laboratory, however, it becomes possible to distribute the units in several ways that make them adaptable to many standard types of building. By providing for light where the work requires, rather than where a window happens to be, further flexibility in placement results. The design of a unit laboratory to meet present-day standards therefore is mostly a matter of meeting, with contemporary materials, the requirements previously listed, without much regard for the restrictions of room or building. In other words, the laboratory (like a kitchen) should be designed from the functional arrangement outward, rather than from the outside in.

The most effective design would obviouly be circular around a central position, but this would be difficult to achieve. The advantages may be approximated by grouping straight-sided units around the same spot. Figure 2 shows one possible U-shaped arrangement of facilities for such a unit laboratory. It is self-contained, with all the basic facilities for chemical research placed within easy reach of a few sitting and standing positions. The writing desk is centrally placed and has a semicircular cutout to hold the many books and references needed in writing reports. Since this is also the ideal shape for a microscope table,[3] the provision of a lamp underneath and a drawer for accessories and reagents allows further use of the microscope in research.

The clear working space, the hood, and sink bear a relation determined by the usual chemical operations that constitute the physical part of every experiment. So standardized are these that by having a place for each operation, much of the usual search for, assembly, and dismantling of successive setups in one spot can be eliminated. An important feature is the provision of adequate storage for reagents and glassware, as much as possible in eye level cabinets. Cupboards below the table surface contain larger apparatus, and drawers contain the corks, filters, pipets, etc., as at present.

The wall space adjoining the sink may have brackets which accommodate rods[4] forming a framework or rack for distillation columns, etc. Being removable, the rack can give way to furnaces or other special equipment. Included, by constructing the table work space in interchangeable units and backing these against preinstalled plumbing and wiring,[5] a flexible arrangement is obtained which permits replacing standardized space for usual work with special facilities for unusual jobs.

In line with such flexibility, it may even be advisable to dispense with the hood and substitute an overhead exhaust manifold equipped with flexible self-supporting tubes of the type now used to draw away chips and dust from power saws and grinders in machine shops. Thus instead of attempting to exhaust continuously a large, open-faced space, as is done rather poorly in present hoods, a small tube drawing in air at high velocity is brought over the offending apparatus or outlet, eliminating the necessity of a restrictive enclosure. Even the vapors of spilled liquids could be "swept up" by such an air stream, no matter where the accident occurred. In effect, this would reverse the present procedure and bring the hood to the equipment.

In the matter of accessories, at least two swivel stools may be hinged to the table framework so that they can be swung in front of the desired table space. This means that the table top should extend sufficiently to give room for the knees underneath. This requires, of course, that the drawers below extend sufficiently beyond the table edge before meeting the automatic stops. A central post could carry a revolving conical head carrying the simple tools like pliers, screwdriver, knife, and scissors which are the chief offenders in the present hunt-and-carry system. The desk chair could be swivelled and adjustable for writing and for use with the microscope. The sink could well be equipped with a foot-operated mixer valve for the hot and cold water.

COLOR DESIRABLE

Color and proper lighting could do much to banish the dim and drab appearance which is so evident in most older laboratories. A laboratory does not have to be dreary just because Kekulé and Berzelius did their classical researches in such places. We are now getting accustomed to light-colored tile or painted walls, but the tendency should be extended to the cabinets, desk, and equipment. Even the table surfaces should be in color instead of the black or dark grey to which we now are limited. The work surfaces could be illuminated by local lamps hidden from direct view, and the general illumination could then be supplied by a centrally-located overhead fixture above each unit laboratory. While daylight is not depended upon for illumination, a view of the outdoors, nevertheless, is desirable to relieve eye fatigue. For the same reason, the window sills should be low enough to allow an outside view from the seated position.

The floor should be resilient and fairly resistant to reagents and solvents. If linoleum could be made more resistant to staining, it would do admirably. However, it should be installed with a cove base sloping upward to the laboratory tables to make cleaning easier, and it should slope gently to a drain in the center of the floor of each unit so that in case of accidental spillage or water leaks during the night there will be no damage nor any inconvenience to other occupants.

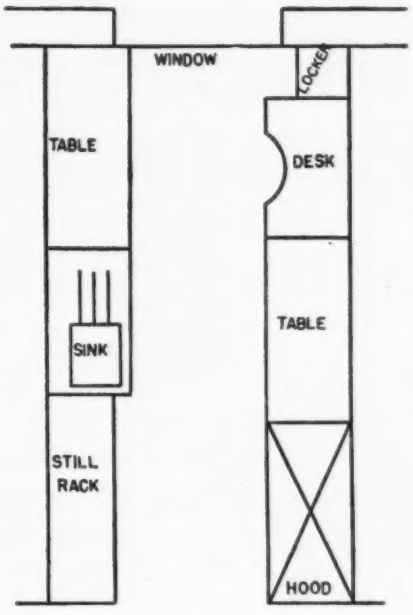


Figure 2

Accessories like laminated glass screens for safety shields and stainless metal hardware would add to the convenience of the unit laboratory but are not essential to the planning. The main considerations are the grouping of advanced facilities in a functional manner about each individual worker, the use of light and color and outdoor view to enhance his outlook, and the arrangement of units to permit conversation with fellow workers without interfering with them.

WHY GO BACK?

Finally, it may be anticipated that many practical objections and criticisms of this or any other "ideal" laboratory arrangement will arise. Those which derive from the necessity of using available building space must be considered restrictions which modify but do not nullify the basic considerations given above. Those other objections which are based on precedent, or on the contention that brilliant work was done a century ago with handmade equipment and with no facilities, are arguments which ignore the very point of this article. It can only be said that while undeniably good pies were made by Grandma in an old wood-burning range, more good pies can be produced per day in the modern kitchen. And who, having once tried the new and found it good, would ever want to go back to the old?

REFERENCES

1. National Research Council Report, Chemical Foundation, New York, 1930.
2. Bjorksten, J., Chemical & Engineering News, Vol. 21, 1328.
3. *Laboratory Construction and Equipment*, p. 235.
4. As is the arrangement at Mellon Institute.
5. As at the new Bell Laboratories at Murray Hill, N. J.
6. See Chamot, *Laboratory Construction & Equipment*, p. 234.

Drilling Muds Pose Chemical Problems

by W. T. CARDWELL, Jr., Research Engineer
California Research Corporation

THE PREPARATION OF OIL WELL drilling fluids is a chemical industry which now boasts annual sales in the tens of millions of dollars. Today, with deeper drillings on the increase, new problems are being encountered, more chemicals are required, new types are being evaluated.

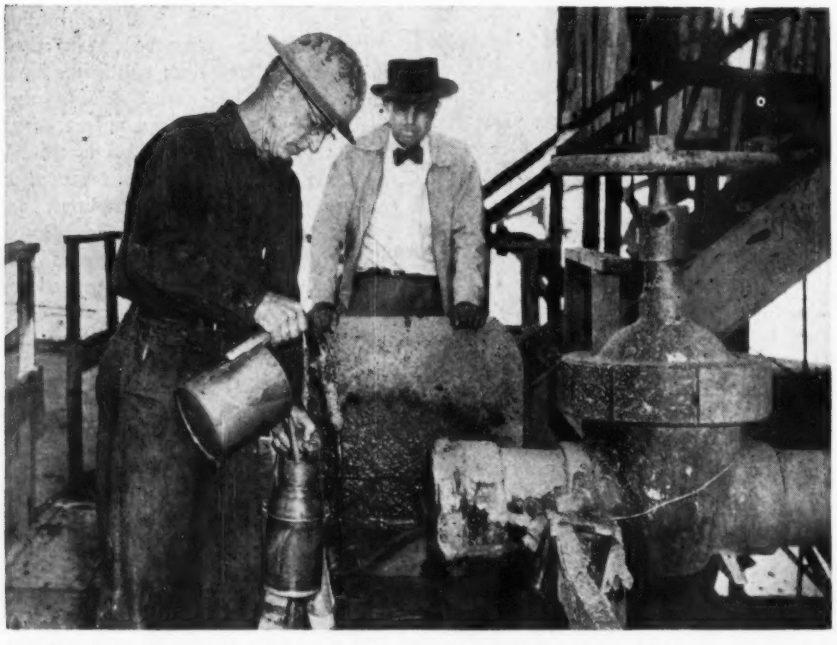
IN THE drilling of oil wells by the rotary method, the hole is cut by a bit on the end of a rotating pipe. As the hole is deepened, new joints are added to lengthen the pipe. The cuttings are continuously removed from the hole by a fluid, usually a clay-water suspension, that is pumped down the inside of the drill pipe, out around the bit, and back up the annulus between the outside of the drill pipe and the hole wall. The fluid containing the cuttings is screened and settled after it reaches the surface to remove the cuttings it has accumulated. It is then pumped back down the inside of the drill pipe. The circulation of the fluid is continuous while drilling is in progress.

MANY FUNCTIONS, MANY INGREDIENTS

A modern drilling fluid performs many functions in addition to the fundamental one of bringing up the cuttings. For one thing, it must prevent high pressure gas and salt water from flowing into the hole. Either of these can cause dangerous and costly blow-outs if uncontrolled. To combat high pressures, the drilling fluid must exert a large hydrostatic head, and must therefore have a high density. Densities up to 135 pounds per cubic foot are required in some Gulf Coast areas. These high densities are obtained by suspending a ground, heavy mineral, such as barytes, in the drilling fluid.

In 1946, according to the Minerals Yearbook of the Bureau of Mines, 373,000 tons of barytes were used in oil well drilling. At the prevailing prices in the oil fields the value of this quantity would have been of the order of $13 million. Barytes is the largest single item in drilling fluid costs.

Other minerals have been used as drilling fluid weighting materials. Ground iron oxide, and ground limestone are perhaps the best known of these. Iron oxide has gone out of favor because it is disagreeable to use. Limestone is of insufficient specific gravity to produce high density drilling fluids having reasonable viscosities. At the present time an attempt is being made to initiate the use of granulated ferrophosphorus having a specific gravity in excess of six. Such a material may come into use in the future if required drilling fluid densities continue to rise as drilling goes deeper.



Samples of muds must be taken regularly to check both physical and chemical properties.

WEIGHTING AGENTS

Another important function of the modern drilling fluid is to protect the penetrated formations from excessive water invasion. The fluid must be so composed that its suspended microscopic and submicroscopic solid particles form a filter cake of low fluid permeability on the hole wall. This minimizes the efflux of water from the drilling fluid into formations which might swell or disintegrate through hydration, slough into the hole, or otherwise impede the drilling. It prevents also the efflux of water into potential oil producing formations, most of which are harmed by additional water, even though they already have an appreciable water content.

SWELLING CLAYS

The problem of preparing fluids of low water loss has been met during the last decades chiefly by the use of water suspensions of the highly swelling bentonitic clays. Suspensions of these clays line the hole with filter cakes of remarkably low permeability to water.

There are other clays, which approximate the swelling bentonites in their ability to form drilling fluids of low filter cake permeability, particularly certain clays found in California. In that State, the so-called natural clays are more widely used than are the swelling bentonites.

All of the clay suspensions require continuing treatment with deflocculating

agents such as caustic soda and protective colloids, for example, quebracho, in order to enhance their good properties and to maintain these properties in spite of contamination by the drilled formations. Some shale formations tend to disperse themselves in the drilling fluid, making its viscosity too high. Salt water, and even crystalline salt, are encountered, which make it extremely difficult to maintain a fluid having low filter cake permeability. Anhydrite formations cause similar problems, which, however, require their own individual treatment.

The chemical treating agents include simple chemicals such as sodium hydroxide, sodium carbonate, and sodium bicarbonate. They include also natural tannins, particularly quebracho. Quebracho, which has come into wide use, is now unavailable in quantities to satisfy the demand. Several chemical companies, as well as the oil companies themselves, are searching for an inexpensive quebracho substitute.

POLYPHOSPHATES VS. QUEBRACHO

During the last decade, the polyphosphates; sodium pyrophosphate, sodium tetraphosphate, sodium hexametaphosphate, and others, attained considerable popularity as drilling fluid treating agents. These salts have a unique ability to control the viscosities of clay-water suspensions.

There is now a noticeable trend, in the Gulf Coast and Mid-Continent areas, away from the use of the polyphosphates. In those areas, operators are returning to the use of sodium hydroxide and quebracho, which were used long before the polyphosphates. New methods of control with these old chemicals have, however, been worked out. Highly alkaline fluids, of pH 11 to 12, are being used with considerable success.

An important development of the last decade is the use of starch in drilling fluids. Powdered, pre-gelatinized starch is added to the drilling fluid in amounts of the order of one per cent. A fluid of very low filter loss results. At the present time, ten million pounds of starch are used for this purpose per year, and its use is apparently increasing.

EMULSION TYPES

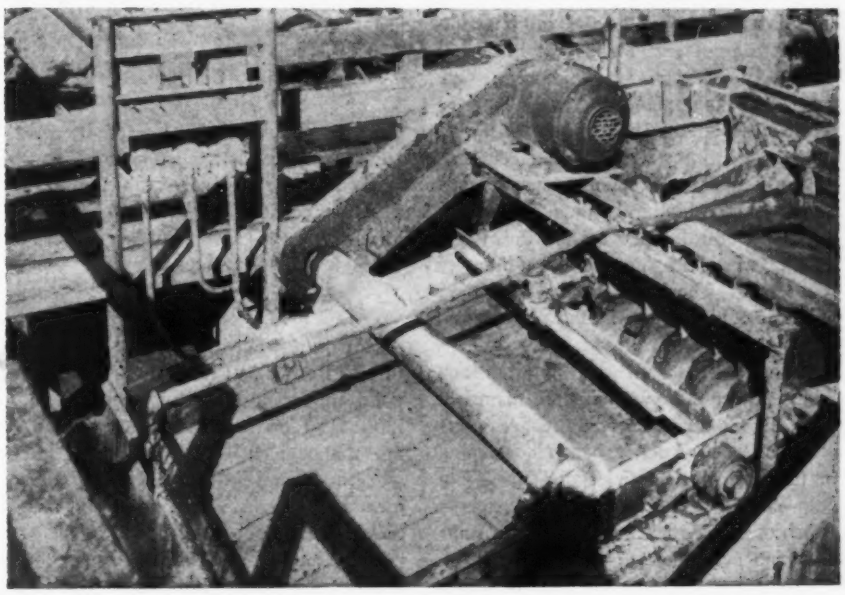
An even more recent development is the use of the so-called emulsion drilling fluids. The usual clay-water suspensions are treated with an emulsifying agent to cause them to hold twenty per cent of crude oil, or refined fuel oil, in emulsified form. The emulsion fluids, like the starch fluids, have very low filter losses.

When it is desired that no water whatsoever contact the formations being drilled, non-aqueous, or oil-base drilling fluids are used. Fluids having a very low filter loss, (now an oil loss, instead of a water loss) are prepared in either of two different ways: by imparting body to a fuel oil vehicle through the emulsification of sodium silicate and tall oil in it, or by dispersing air-blown asphalt in the vehicle. Other ingredients are added to inhibit the sedimentation of weighting materials, and to provide resistance to contamination. The formulations are expensive, ranging from five to ten dollars per barrel, whereas ordinary clay-water drilling fluids cost from one to two dollars per barrel, and even the special starch and water-base-emulsion fluids cost only two to four dollars per barrel. Since the drilling fluid system of a well may contain a thousand barrels of fluid, it may cost several thousand extra dollars to drill a well into its producing formation with oil-base fluid. In spite of the high cost, operators in certain fields, variously located throughout the United States, feel justified in completing every well with oil base fluid, in order to insure maximum future productivity.

The drilling fluid system of a well may contain a thousand barrels of fluid, so price per gallon is a major factor. Among the more popular types: easily mixed clay-water compositions.

FERTILE RESEARCH FIELD

The field has been extensively explored, nevertheless there are many drilling fluid problems waiting to be solved. The general problem of maintaining low filter losses, and pumpable viscosities at high densities, while contaminating formations are being drilled, is one that will continue to demand extensive research. Each year witnesses new solutions. But as new areas are drilled, and old areas are drilled deeper, new problems are encountered, and the old problems become more acute. The chemical problems of drilling fluid control form a fertile field for research.



Labs govern chemical composition; field men must screen muds to remove foreign cuttings.

WOOD, PAPER AND PULP:

Important Factors in Western Industrial Growth

A DISPROPORTIONATELY LARGE SHARE of the national wood industry is in the Far West; and sizable, too, is pulp and paper production. The significance of these industries to chemical producers was emphasized at the recent Conference on Western Chemical Markets in San Francisco.

CONCURRENT with the Pacific Chemical Exposition, the Western Chemical Market Research Group sponsored a symposium on Western markets. Of the eight technical papers presented, six—those dealing with the chemical, petroleum, plastics, coatings, agriculture, and food industries—were abstracted in last month's issue of CHEMICAL INDUSTRIES. The remaining two, dealing with wood and with pulp and paper, are, because of their inherent importance, excerpted in somewhat greater length here:

WOOD IN THE WEST

Peculiar to the West, in that it accounts for a disproportionately large share of the nation's output, is the Western wood industry. Clark C. Heritage, Weyerhaeuser Timber Co., discussed its significance in terms of chemicals consumed. He said:

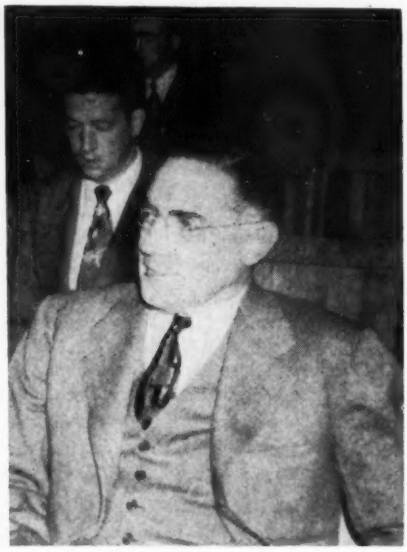
Within the boundaries of the Western states is found approximately one-fourth of the commercial forest land and two-thirds of the land that bears trees of saw timber size in the United States. The total wood volume of all trees on this land is estimated to be 239 billion cubic feet with a current annual growth of 2.31 billion cubic feet. This annual growth represents the possible yearly harvest without depletion were it not for losses due to fire, insects, and decay.

Wood, with its two major constituents, cellulose and lignin, is thus one of the greatest natural resources of the West.

In plywood, the Western wood industry is a leader. The West produces 95 to 99 per cent of the national total of softwood plywood.

In addition to structural forms and besides the use of wood in the manufacture of pulp and paper, there are many other uses for wood as such developing in the forms of particles and fiber—not pulp—and not necessarily for paper—which open new fields for chemicals, some of which may become substantial.

What are the superiorities or sufficiencies of wood that have made lumber and wood useful and desired commodities for many years? The answers are found in the following seven qualities: strength and stiffness; light density; ease of working (softness); ease of finishing (absorbency); resistance to water; pleasing to the senses of sight, smell and touch; and low cost (thus a high ratio of utility to price).



Clark C. Heritage

Ready availability of supplies, low transportation costs, ease of erection and alteration, high salvage value, and simplicity of construction equipment and tools all combine to perpetuate this cost advantage for wood construction.

WOOD'S DEFICIENCIES

However, wood is not a perfect structural material. It is now only fair to point out and discuss its failings and limitations by answering the question: What are the deficiencies of a piece of wood whereby it may fail to meet the requirements of use with consequent consumer dissatisfaction?

These annoying deficiencies can be summarized briefly as insufficient resistance to decay and insects, combustibility, dimensional instability, discontinuities or abnormalities of structure, anisotropy (i.e., grain), and the limiting dimensions of a single piece. Anisotropy in wood refers to the exhibition of different properties when tested along axes in different directions. The unequal shrinkage along tangential, radial and longitudinal axes comes within this definition. So also do the properties of compression strength, shear strength, stiffness or resistance to bending, thermal expansion and electrical resistance.

Chemicals are used in the production of salable pieces of wood mainly to overcome the deficiencies already discussed and to do so wherever possible without sacrifice of the inherent superiorities of the wood.

Since wood is a renewable resource, a growing crop, preservation of its superiorities and correction of its deficiencies can well begin in the forests. Thus there are two main uses of chemicals in the wood industry: 1. Chemicals used in silviculture and 2. Chemicals used in wood processing.

The use of chemicals in silviculture and associated fire-control work in the forests has been very limited but is increasing. Various salts are used to kill wolf trees (undesirable species that shade and prevent the growth of seedlings) by injecting salt solutions into the sap. Ammate, 2-4-D, and other weed killers are being tried experimentally to kill brush along roadsides and power line rights-of-way to reduce fire hazards. One of these weed killers, Atlascide, has been used for the control of white pine blister rust. Chloropicrin is used to sterilize soils in tree nurseries. These chemicals are all manufactured in the East.

Some of the water-soluble fire-retardants have been used as sprays to reduce the fire-hazard of slashings during the dry seasons and until the rainy seasons permit safer burning of these slashings piles. These sprays have been applied also to power line rights-of-way.

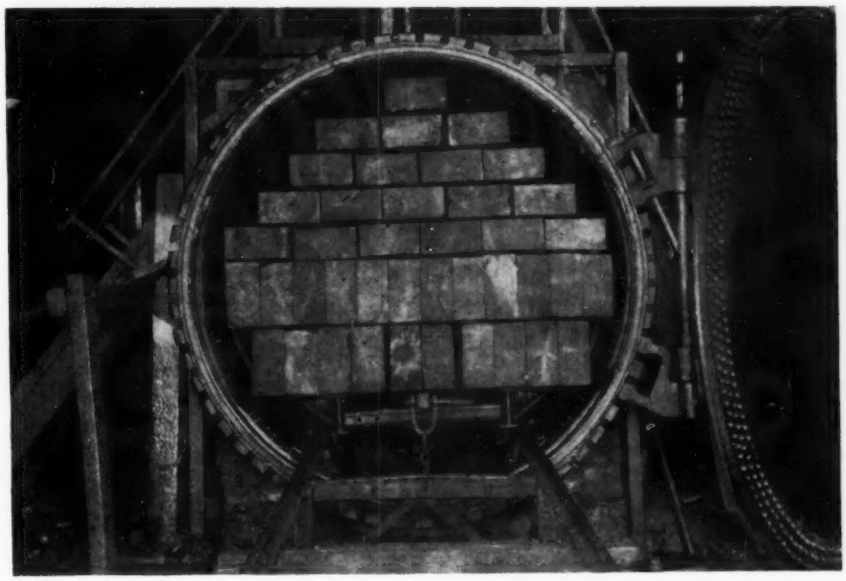
Insect control in silviculture has used much higher quantities of chemicals. Numerous chemicals, principally DDT and arsenicals, are used as sprays and dusts to control insects such as, spruce budworm, black-headed budworm, hemlock looper and tussock moth. Probably as a result of the relatively high cost, no pest of the Western forests has actually been fully controlled; but enough work

has been done to prove that control is possible. For example, approximately 350,000 pounds of DDT were recently used in the White Pine belt of Idaho to destroy a tussock moth infestation. DDT is now manufactured in Portland, Oregon.

Rodent control is another phase of the use of chemicals in silviculture. Several poisons such as strychnine alkaloid, thallium sulfate and "1080" have been used to kill rodents which damage young trees and eat seeds. These chemicals are all manufactured in the East.

PRESERVATIVES

Wood preservation is used to preserve the wood against decay and thus prolong its serviceable life. Advances in wood preservation also have brought within commercial acceptance standards species of wood previously considered worthless as lumber, thus enlarging the wood industry's potential supplies.



(Courtesy the Du Pont Co.)

Wood is loaded into a pressure chamber for treatment.

Perhaps thousands of chemicals have been tested to determine their ability to meet the requirements listed above for a preservative. The following classes of chemicals have evolved: (a) preservative oils that are of low volatility and only slightly soluble in water; (b) inorganic salts and similar materials that are used in water solution; and (c) toxic chemicals that are dissolved in some preferably colorless and usually volatile organic solvent.

Coal-tar creosote, solutions of creosote, coal-tar, and petroleum come under the classification (a), preservative oils, just mentioned. In 1945 the Western wood industry consumed 30.8 million gallons of total creosote oils or 15.8 per cent of the United States total of 195.2 million gallons. Solutions of creosote and petroleum are the next most important preservatives in volume of use. In 1945, the West used 28.2 million gallons out of a United States total of 63.9 million gallons, or 44.1 per cent. Over the years the consumption of creosote has increased at a rapid rate with only temporary setbacks. Producing capacity of the country's coke-ovens and steel mills are limiting factors in use of these preservatives.

Next preservative in order of long-time commercial importance is chromated zinc chloride, one of the (b) class of water-soluble salts. Chromated zinc chloride had its peak use in the World War II years of 1940-1942, then fell back, but is now slowly recovering. In 1944 the Pacific Coast was using approximately a fifth of national consumption of 2,200,000 pounds, but in 1945 its use fell off 50 per cent from the previous year. Due to its tendency of leaching out in moist climates it is used primarily in drier interior regions. Wolman salts of late have been only one-third as popular as chromated zinc chloride nationally with nearly 60 per cent of the 1945 national total consumed in the Pacific Coast states. These salt compounds are all produced in the East and Mid-west and 1947 production and use is estimated at about one-third higher than the figures for 1945.

For interior use and painted surfaces the third (c) type of preservatives has been developed; viz., toxic chemicals that dissolve in colorless, odorless and usually volatile organic solvents. Examples of these are beta naphthol, chlorobetanaphthol, tetrachlorophenol, pentachlorophenol, and chloro-orthophenylphenol. Cheap, volatile petroleum distillates of specific gravity below that of kerosene usually form a very large proportion of these mixtures.

From a recorded start in 1945 of about 280,000 pounds consumed nationally, pentachlorophenol was used to the extent of about 15 million pounds in 1946, of which an estimated two-thirds was consumed on the Pacific Coast. Estimates for 1947 indicate a national consumption of perhaps 20 million pounds with the West taking the major part of it. It is presently manufactured in the East. It is expected to have a place of its own besides replacing some creosote.

Some orthodichlorbenzene has also been sold for wood preservation but only to the extent of about 500,000 pounds per year and principally for termite control.

FIRE-RETARDANTS

Fire-retardant coatings and impregnations are chiefly of value to delay ignition and check the spread of fire over wood surfaces.

Of the fire-retardants, sodium silicate, boric acid, borax, phosphoric acid, the ammonium phosphates and ammonium sulfate are manufactured in the West. The Pacific Coast used approximately 384,000 pounds of Minolith both in 1944 and 1945, corresponding to 41.5 and 50.9 per cent of the national consumption respectively. According to Federal Specifications Type No. 2, Minolith contains approximately 60 per cent ammonium sulfate, 10 per cent ammonium phosphate, 20 per cent boric acid and 10 per cent borax. The only other fire-retardant used in the West during these two years in significant quantities was chromated zinc chloride to the extent of 120,000 pounds in 1944 and 41,500 pounds in 1945. The Western consumption in 1944 was 75.8 per cent of the national total but only 5.5 per cent in 1945.

Chemicals are used in the wood industry for dimensional stabilization primarily to prevent or reduce swelling and shrinkage. Generally speaking these chemicals are phenol-aldehyde, urea-aldehyde and dimethylolurea resins.

As far as is known no dimensional-stabilizing resins of the phenolic type are being used commercially on the Pacific Coast although quite a few companies have used them experimentally. Dimethylolurea has been tried by a number of Western plants as a combined stabilizing and hardening agent and a British Columbia firm is in production on such treated wood.

Discontinuities or abnormalities of wood structure such as knots, checks, shakes, cross-grain, and pitch pockets can cause losses in lumber strength and commercial losses due to the degrading of lumber.

VINYL SEALER

Formerly shellac was used to seal knots in place, but today it is being gradually replaced by a sealer composed of a phenolic resin, polyvinyl butyral and denatured alcohol. Consumption figures for these chemicals for this purpose are not

available but over twenty-five paint manufacturers are now offering this sealer.

Certain hygroscopic chemicals upon being forced into wood increase its equilibrium moisture content and in effect slow down its rate of loss of moisture enough to minimize checking and splitting stresses. Many inorganic salts have this property but urea seems to show greater utility in this field. As freshly sawed green lumber is stacked for seasoning powdered urea is spread on the upper moist surface of each layer whereupon it diffuses into the pores of the wood. The minimum quantities needed to prevent checking when the lumber is kiln-dried after treatment is 40 lbs. urea per 1000 bd. ft.

Drying lumber loses moisture ten times more rapidly through the end grain than through the vertical or flat grain faces. The uneven drying and shrinkage stresses may cause large end-splits, end-checks, etc. In an effort to overcome this defect, many West Coast lumber mills have long practiced application of moisture-retarding paints to the end-grain of items most susceptible to end drying. Three formulations that reduce the rate of loss of moisture to about 50 per cent that of untreated wood contain varying proportions of rosin, naphtha and quicklime, or gloss oil, asbestine, and barium sulfate, or gloss oil, No. 20 Western lubricating oil, asbestine and barium sulfate.

The industry has experimented with many methods of removing pitch, including organic solvent extraction. Acetone, while successful in this application, was found to have the more valuable property of aiding the seasoning of wood by extracting moisture simultaneously with pitch. Thus developed the well known solvent seasoning process for lumber drying, which has undergone pilot plant trials at Bend, Oregon.

LAMINATES AND PLYWOOD

To overcome the limitations on the size and shape of single pieces of wood, the wood industry employs substantial amounts of adhesives to bond several or many pieces of wood into larger units or shapes or into special products. This phase of the industry divides naturally into two main branches: (1) laminated wood and (2) plywood.

Structures fabricated from laminates include beams, boat hulls and keels, barn rafters and smaller specialty items. Synthetic adhesives, in addition to protein glues, employed are several, with consumption distributed approximately as follows: 80 per cent phenol-resorcinol type, 15 per cent thermosetting polyamides and 5 per cent urea-melamines. About 500,000 pounds of adhesives are used annually in this industry in the West, of which 350,000 pounds are actually of Western manufacture.

Edge gluing of small lumber to produce lumber cord for desk, table top and similar uses is a phase of the laminated wood industry that bears watching for both synthetic resins and animal glues because both find application here. In the synthetic group the ureas and urea melamine resins are particularly important because of their speed of cure and cost.

Today the Western softwood plywood industry produces annually the equivalent of 1.5 billion square feet of ⅜ inch thick plywood, or between 95 and 99 per cent of the national total. 97 per cent of the Western production is from Douglas fir, and the remaining 3 per cent is from Ponderosa pine.

It is interesting to note that while there was a temporary slackening of production following the cancellation of war contracts, data for the first half of 1947 indicate a rapid recovery.

In addition to employing adhesives for the bonding of several veneers to form the plywood panel, the plywood industry consumes further quantities of adhesives for the purpose of upgrading the individual veneers and for veneer edge gluing. Nearly one million pounds (50% solutions) of urea and resorcinol glues are used annually in veneer patching while upward of one and one-half million pounds (50% solutions) are used each year in veneer edge gluing. Substantial additional quantities of adhesives are consumed in the West in plywood assembly gluing of all types in the manufacture of furniture, boats, trailers and other articles.

Various coating compositions, aside from paint, varnish and lacquer, come into use wherever it is desirable or necessary to alter the characteristics of a wood surface for purposes of protection, appearance or other effects.

The Western plywood industry during the war years clad a sizable amount of its product with a phenolic resin impregnated paper for the purpose of providing a continuous moisture resistant, scuff-proof surfaced plywood sheet. Based on an assumed average coverage of 120 pounds per thousand square feet of ply-

(Courtesy W. Va. Pulp & Paper Co.)

Pulp is conveyed by belt between bleaching tanks used for five stages of bleaching. Motors at the right drive agitators which stir pulp continuously during the bleaching operation.

TABLE I: Western Consumption of Adhesives and Chemicals in the Softwood Plywood Industry (99% of U. S. Total)[1]

(All figures in thousands of pounds)

Adhesives and Chemicals	*Source*	*1947 1st Half*	*1946*	*1945*	*1944*	*1943*	*1942*
Casein glue	East	2,600	3,600	3,200	2,000	4,000	3,600
Soy bean glue	Mid-West	12,800	21,000	22,600	28,000	26,000	37,400
Phenolic resins[2]	West	16,800	23,600	19,400	23,200	19,800	17,200
Sodium silicate	West	4,000	6,200	6,600	7,600	7,600	10,400
Lime	West	1,600	2,600	2,800	3,000	3,000	4,400
Caustic soda	West	1,000	1,600	1,800	2,000	2,000	2,800
Other glues (Urea[3], blood, etc.)	Mid-West and East	1,400	2,000	2,200	3,000	3,400	3,400

[1] Includes Western pine plywood amounting to about 3% of the total protein glues.
[2] Actual solids content (phenol-aldehyde; caustic, etc.) is about 40% of these figures.
[3] Urea consumption is currently estimated to be 700,000 pounds annually in the plywood mills.
Source: Courtesy of Douglas Fir Plywood Association, letter dated 9-25-47.

wood, the current annual consumption of phenolic resin in plywood cladding is estimated at 1.3 million pounds. It appears that the potential consumption for this use will be substantial.

The lighter colored, special decorative effects that are possible through the use of overlay papers impregnated with resins such as the melamine type have not been an important factor in the West to date. However, substantial quantities of such overlay sheets, fabricated in the East, are appearing on the Western market today.

Numerous other surfacing materials will undoubtedly find their way into the wood industry bringing with them new types of bonding chemicals that are today foreign to the wood industry.

PULP AND PAPER

Related to the wood industry and supplied by it is the manufacture of pulp and paper. Its role in the consumption of industrial chemicals was evaluated by Robert G. Mispley, Crown-Zellerbach Corp. He said:

Chemicals for primary pulp production are sulphur, limestone, lime, salt cake, soda ash, and caustic soda.

PULP CHEMICALS

Sulphur, basic raw material of the sulphite process, which comes from Louisiana and Texas, is being used at the rate of approximately 400,000 tons annually in the pulp and paper industry, which quantity is about 10 per cent of the total production. Pacific Coast requirements are 145,000 tons.

R. H. Ewell, chairman, and R. G. Mispley.

Limestone is used in the manufacture of sulphite cooking liquor to the extent of 440,000 tons annually. Of this total, the West uses 173,000 tons, the source of which is local.

The major percentage of lime is consumed in the sulphate and soda processes. Current annual usage is 500,000 tons, about 12 per cent of the total production. About 50,000 tons are used in the Western industry.

Salt cake, reduced to the sulphide, is the basic component of the sulphate pulping process. The industry current consumption, practically the entire production, is 650,000 tons. Pacific Coast usage of about 60,000 tons is mainly from natural deposits in California.

Soda ash is a source of alkali in preparation of the sulphate and soda cooking liquors. Current consumption is about 5 per cent of the total production, at the rate of 150,000 tons annually, 10,000 tons of which are used on the Coast.

Caustic soda is a secondary pulping chemical. It is used in the preparation of purified cellulose for rayon pulps. Annual consumption is about 110,000 tons, about 6 per cent of the total. Based upon bleached pulp production, approximately 30,000 tons are required in this area.

In one form or another, chlorine finds application in most bleaching processes. With the very rapid increase in production of bleached pulp, chlorine is very important in the industry. Approximately 250,000 tons, or 30 per cent of the total production, is so used. The Pacific Coast requires 50,000.

Other bleaching agents are used in minor quantities. Zinc hydrosulphite and sodium hydrosulphite are examples. A newly developed process uses hydrogen and sodium peroxide.

PAPER CHEMICALS

The above chemicals are used in the pulping industry. For the manufacture of paper, the list is more varied, though not so universal or of such magnitude.

The most important of all sizing materials is rosin. About 100,000 tons are required each year, a little over 20 per cent of the U. S. production, the Pacific Coast industry consuming 10 per cent of the total.

A necessary adjunct to the use of rosin size is papermaker's alum. It is the precipitant for the rosin. The paper industry requires approximately 150,000 tons, nearly 35 per cent of the total production. Western pulp and paper manufacture uses about 15,000 tons.

Sodium silicate is a chemical of sizable consumption, being used to the extent of approximately 400,000 tons annually. This is about 40 per cent of the total production.

Starch is of wide application for many uses. Usage is approximately 125,000 tons annually, about 10 per cent of the total.

A wide variety of minor sizing agents such as wax, asphalt, soya bean flour and protein, casein, and glue, are also used.

Many different pigments are used, both natural minerals and manufactured chemicals, to achieve the desired opacity, printability, color, smoothness and softness in the finished paper. Clay is the most widely used pigment. At present around 600,000 tons, 60 per cent of total production, are consumed annually.

Other fillers which are used are titanium dioxide, barium sulfate, calcium sulfate, talc, calcium carbonate, zinc sulphide and oxide, lithopone, blanc fixe, and diatomaceous earth.

Although not of large quantity consumption, individually, a great many other chemicals are of indispensable application.

ROOM FOR GROWTH

There are extensive clay deposits in the West, characterized by low color and considerable overburden. Whether or not a material acceptable to the paper industry could be produced presents a challenge.

A recent development in the West has been of interest to the paper industry. That is the production of the guar bean, in Arizona, for the production of a high wet-strength factor in paper toweling.

Table II: Annual Pulp and Paper Output, Chemical Consumption

Pulp, Paper and Board	*United States Tons*	*Pacific Coast Tons*	*% of U.S. Tons*
Pulp	10,605,000	1,754,000	17½
Sulphate	4,597,000	414,000	9
Sulphite	2,476,000	966,000	39
Mechanical	1,812,000	312,000	17
Soda	466,000	21,000	4½
Others	1,254,000	.....	..
Paper	19,180,000	1,565,000	7½
Board	8,450,000	450,000	5

Chemicals	*Used In U.S. Pulp & Paper Industry —Tons*	*Used In Pacific Coast Pulp & Paper Industry —Tons*	
Sulphur	400,000	145,000	(imported)
Limestone	440,000	173,000	(local)
Lime	500,000	50,000	(local)
Salt Cake	650,000	60,000	(local)
Soda Ash	150,000	10,000	(local)
Caustic Soda	110,000	30,000	(local)
Chlorine	250,000	50,000	(local)
Rosin	100,000	10,000	(imported)
Alum	150,000	15,000	(local)
Clay	600,000	30,000	(imported)
Titanium pigments	30,000	.....	(imported)
Talc	30,000	.....	(local)
Sodium Silicate	400,000	.....	(local)
Starch	125,000	.....	(imported)
Dyestuffs	25,000	.....	(imported)
Casein	10,000	.....	(both)
Soya Bean*	35,000	.....	(imported)
Calcium Carbonate	75,000	.....	(imported)
Glycerine	6,000	.....	(local)
Sugar—invert	5,000	.....	(imported)
Sulphuric Acid	9,000	.....	(local)
Wax	100,000	.....	(both)
Asphalt	.....	7,000	(local)
Glue	8,000	.....	(local)
Sodium Aluminate	5,000	.....	(imported)
Enzymes	500	.....	(imported)

* This tonnage of beans is processed into products used by the paper industry.

Could potato starch economically compete with corn starch, and could chemurgic development assure the industry of a uniform quality and adequate supply, potato starch would undoubtedly find considerable application. Idaho, Oregon, California and Washington have existing plants and the problem, a cooperative one with the paper manufacturers, is promising of a successful conclusion.

Should the peroxide bleaching process for groundwood pulps develop into an appreciable volume, economics would favor a local supply of the chemical. Plans for peroxide production have been carried sufficiently far so that the providing of manufacturing facilities awaits creation of the market for the chemical.

"Wetter Water" Pares Fire Losses

by H. W. ZUSSMAN,
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SURFACE-ACTIVE AGENTS HAVE MULTIFARIOUS USES, but among the more unusual is their incorporation in water-based fire control agents. Research results indicate that such additives speed the extinguishment of certain types of fires, and, in some cases, reduce explosion hazards.

IN CHEMICAL terms, fire extinguishment occurs when the combustion rate of the burning material is reduced substantially to zero; this may be accomplished by reducing the temperature of the material below the ignition point and/or reducing the concentration of oxygen over the burning material to a negligible value.

The cooling action of water—associated with its unusually high specific heat and latent heat of vaporization—along with the blanketing action of its steam vapor (formed at comparatively low temperature) coupled with the obvious facts regarding its physical form, non-flammability, availability, cheapness and harmlessness, recommend this material as a wellnigh ideal fire extinguisher.

INCREASED EFFICIENCY

Yet water has its shortcomings. There are many types of fires, especially those involving immiscible solvents and oils on which application of water may be ineffective or detrimental (as ordinarily used). Fires on difficultly wetted solids or those deep seated in dense systems are not put out readily. Often, damage due to the use of excessive amounts of water outweighs fire damage. Considered generally available, water supplies nevertheless do vary seasonally or may not be locally accessible, necessitating haulage, particularly in rural and forested areas.

Fortunately, there is currently accumulating a mass of evidence that the effectiveness of water as a fire extinguishing medium may be increased by the addition of various chemicals, including surface-active agents.

PIONEER PROTEINS

The first successful attempts to chemically modify water for fire-fighting involved improvement of the blanketing properties of this material by incorporating foam-producing ingredients—such as bicarbonates used in conjunction with acids or acid salts. White[1] notes that the use of licorice root as a foam stabilizer for such systems was sufficiently widespread in Germany by 1909 to attract the attention of a U. S. consul. The eventual replacement of the saponaceous plant extracts by more available and cheaper synthetic surface-active agents was inevitable.[2]

The limitations of these systems, dependent on the use of carbon dioxide foams, led to the development of protein foams in which the gas phase is generally air. Protein foams have the valuable property of heat stability; like beaten egg white which may be baked to a voluminous, stable meringue at oven temperatures, protein foams used in fire extinguishing bake on the flaming surface, form a heat-stable blanket which smothers the fire beneath. The use of these products gained considerable impetus during the war, particularly in military and naval installations; their continued use, particularly on oil fires, appears assured.

There is considerable recent patent literature on protein foam fire extinguishers.[3] According to the art, such protein materials as glue, hoofs, hair, leather, fish scrap, soy or maize flour are partially hydrolyzed to peptones; excessively degraded proteins are undesirable as they do not bake. Heat stability of protein foams is enhanced by the addition of ferrous sulfate or aluminum acetate which yield film strengthening hydrates at high temperatures.

The volume of foam produced may be increased by the addition of surface-active agents, which, at the same time, probably improve the spreading and penetrating properties. While the patent literature leaves the impression that a great variety of surface active agents may be used (soaps, alkyl sulfates, petroleum sulfonates, alkyl phosphates, etc.), the exigencies of actual usage limit the practical types sharply; they must obviously be compatible with the protein hydrolysate, must have good solubility and stability, must be effective in hard water or sea water, and, to be commercially acceptable, must often meet more or less arbitrary specifications.

SURFACE-ACTIVE ADDITIVES

Another line of development evident from the patent literature centers on the use of surface-active agents alone in water.[4] It may be pointed out that although some of these materials will produce foams capable of withstanding direct flame, the foaming property does not appear to be directly associated with fire-extinguishing efficiency. Of considerable interest is an old I. G. Farben patent (British 319,083) which notes that 1-2% of various wetting agents are capable of extinguishing fires on coal, dust, paper, wood and straw, and that such action is not accompanied by foaming. Curiously enough, the use of wetting agents in this manner did not become widespread.

During the past few years, on the insistence and with the encouragement of volunteer firemen organizations (which have to cope with the problem of water haulage in fighting rural and forest fires) the investigation of wetting agent solutions as fire extinguishing media was reopened.[5] It has been carried on by insurance companies, government agencies, fire protection equipment companies and manufacturers of wetting agents.[6]

The results of some of this work are here summarized, bearing in mind that experiments were exploratory and that very few of the factors involved have been studied.

EXPERIMENTAL RESULTS

In a series of sixteen wood fires[7] in which the type and concentration of wetting agent was varied, it was found possible to increase the efficiency of water as a fire extinguisher as much as 200% by the addition of 1% of some wetting

agents. Figures 1 and 2 indicate test methods developed and originally used in this work at the Factory Mutual Laboratories in Norwood, Massachusetts. Under the conditions of test, however, some wetting agents were found to be ineffective or detrimental; they might well have shown up more satisfactorily under other conditions. There was no particular correlation of efficiency as a fire-extinguisher with such surface-active properties as foaming, wetting, penetrating power and surface tension.

In another series of 34 tests[8] one particular wetting agent was used at 0.5% active concentration for extinguishing kerosene fires, varying the method of delivery with particular reference to the nozzles employed. These tests indicated that the efficiency of water could be markedly increased; extinguishment of kerosene fires was obtained with greater regularity by use of "wetter water" than with untreated water.

In still another series of tests on four gasoline and four benzol fires of about 12 square feet surface area, 2% wetting agent in water was effective in every case[9]; water alone was ineffective in the control tests. Large scale experiments were not run.

Wetting agents have been used with success on a practical scale in combating Class A fires (wood, etc.) generally, including brush, residences, barns, paper, rubbish dumps. Practical experience with solvent and oil fires is meagre.

PROBLEMS SURMOUNTED

The engineering problems involved in the use of wetting agents have been partially solved. Equipment design for proportioning concentrated wetting agent into a stream of running water already exists; and, where desired or necessary, the wetting agent may be dissolved at usage concentration in storage or booster tanks for direct delivery to the fire through hose or sprinkler systems. There is some evidence, however, that there may be optimum pressures and sprays for applying wetting agents most effectively.

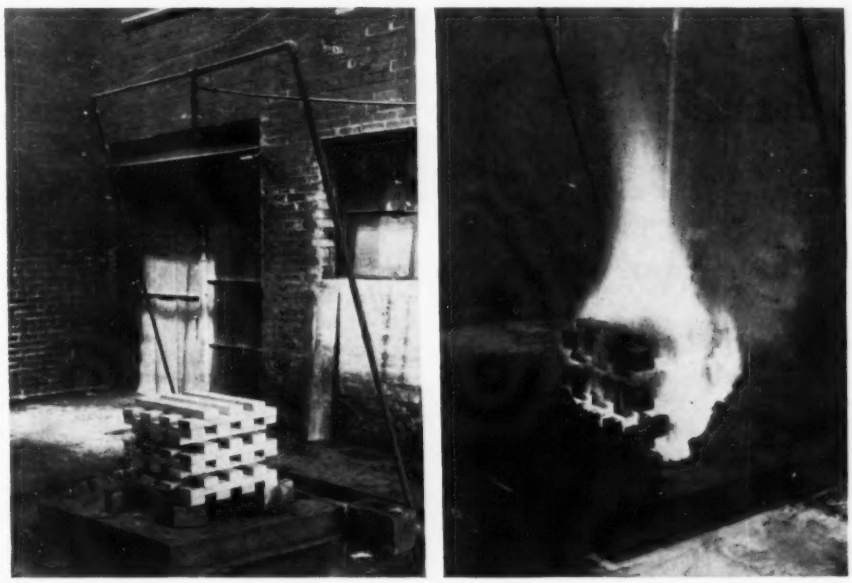
From the experience to date, these secondary requirements for a fire-extinguishing wetting agent would seem desirable: (1) it should be non-corrosive to equipment and non-injurious on materials applied to; (2) it should have high water solubility at low temperatures; (3) it should have low viscosity at high concentration—good flow properties, where used in proportioning systems; (4) it must be inexpensive to use; (5) it should be stable for long periods of time; (6) it should be unaffected by hard water.

The mechanism involved in these effects is not entirely clear. While it is true that the effectiveness of untreated water may be improved by delivering it as a spray or fog rather than as a solid stream to an oil or flammable liquid fire[10] or to wood fires, wetting agents had no significant effect on break-up and range of a water stream delivered from a ⅜" nozzle at 70 psi.[11] Actually, in experiments using small portable extinguishers fitted with smaller nozzles, wetting agents caused considerable break-up of the water stream, with loss of range, velocity, and continuity of discharge.[11]

It is not unlikely that the emulsifying action of a wetting agent in solvent and oil fires may be significant, but this certainly is not operative in wood fires. In the latter case, it may be that treated water with its expanded surface, better spreading, penetrating and poorer shedding properties, has better heat transfer properties; unfortunately, it does not account for those wetting agents which show up poorly as fire-extinguishers.

EXPLOSION CONTROL

Surface-active agents have found still another application in the control of dust explosions. This not uncommon hazard in the bituminous coal fields has increased with growing mechanization and working of deeper mines. Work in England[12] and at the U. S. Bureau of Mines[13] has indicated that wetting agents applied at the cutting, on conveyances and passageways, is effective in reducing airborne dust.



Left: Test set-up before ignition, used at the Factory Mutual Laboratories. Right: Five minutes after ignition and seven minutes before turning on water spray.

Davis, Gardner[14] reported that 0.1-0.2% wetting agent reduced dust 50-70% as against 26% for untreated water. According to one test at the Bureau of Mines, however, wetted dust—once dried out—was just as susceptible to explosion as untreated dust; continuous rewetting of floors, etc., combined or followed by such dusting would seem desirable.

THE OUTLOOK

Wetting agents have also been used in humidifying units of air conditioning systems for clearing air of dust. It is quite likely that industrial installations for this purpose will increase; aside from reduced explosion hazard, improved visibility conditions and health considerations are important factors.

Fire protection has been submitted to scientific analysis and treatment only in the past few decades. Fire loss—even in peacetime—in terms of life and dollars is not inconsiderable; in this country alone, loss of life due to fire is 11,000 while property losses run to about $1,000,000,000 annually. Chemical research certainly has something further to contribute to this problem.

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How to Utilize MARKET RESEARCH DATA In NEW PRODUCT PRICING

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THE RATE AT WHICH THE PRODUCTION CAPACITY for a new chemical should be expanded poses a most difficult problem. Here the author has formalized a method of integrating new product production costs with market research data to aid management in deciding the price to be charged and the size of pilot plant and initial commercial plant.

IN A previous article[1] two methods of amplifying the information resulting from pre-construction cost analysis of new products were discussed, specifically the correlation of operating cost and investment with plant capacity and the use of the "break-even" chart. Any such analysis of the economics of a new material must, of course, bring in the results of market research on the new product and it is obvious that the cost must be evaluated in terms of the potential market at reasonable prices. This can be done in many ways, and either formally or informally. Two of the methods of correlation between economic data and market research results which can be utilized are presented here.

VALUE OF MARKET RESEARCH

The value of market research as applied to new chemicals has now been almost as widely accepted as it has been in the consumer goods industry. The methods and approach to chemical market research differ somewhat from their counterpart in other industries but the major objectives are the same: to determine the market for a product at various selling prices, what share of the market a particular company can expect to attain, and an approximate program of sales volume versus the time following installation of a production unit.

Without going into methods of deriving the necessary data, one result of an adequate market research analysis can be summarized by the construction of a sales versus price curve. Such a curve, Fig. 1, shows the expected sales of the new chemical for various market prices *after* a reasonable introductory period has passed—say two or three years after the product's first introduction on the market.

Using such a curve the economist can now superimpose his cost versus capacity curve, the derivation of which was discussed last month.[1] Such a combination is illustrated in Fig. 1. In this case it can be seen that the production capacity must be equal to or greater than A before sales of the product will show a profit. If any plant is built with a capacity less than A it cannot operate cheaply enough to sell the full capacity of the new plant at a price which will produce a profit. Point B illustrates the production capacity of the largest single unit plant the chemical economist believes to be practical, and hence the bottom limit on cost of production. This capacity may be set by the maximum practical size of various component units of the plant such as still columns or heat exchangers, or it may be set by the investment in the plant which management is prepared to make at one plant site. Hence any increase in capacity beyond B will require duplication of units and give little if any decrease in costs. Point C represents the largest foreseen output which will be profitable. All sales beyond this output must be at a price lower than achievable costs.

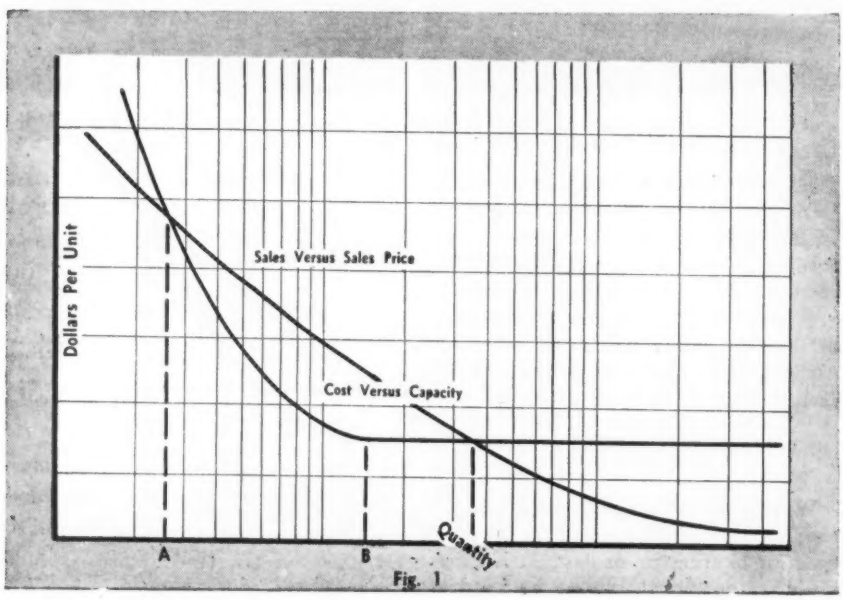

Fig. 1

Fig. 1 shows only one form that these superimposed curves may take. There are others, some showing a good future for the new chemical, some no future at all. Some of these possibilities are shown in Fig. 2. Fig. 2a and 2b show the extremes, the first showing a profitable situation at any scale of operation, the second showing no possible profit. Fig. 2c shows a situation in which no profit is shown until a given scale is reached, but beyond this the product will be profitable. Fig. 2d shows the reverse, a product which can be profitable on a small scale but which cannot be made cheaply enough to achieve large scale production. The last two pairs of curves show two of the combinations possible, 2e where profit is only achieved at an intermediate scale, and 2f where profit is possible only at small or very large scales.

PRODUCTION RATE VS. PROFIT

With a pair of superimposed curves of this type, the next step is usually to derive from them a second pair of curves more clearly showing the relationship of production rate and profit. Using a set of curves of the form of Fig. 2d, the new curves are shown in Fig. 3. Here the relationship is shown between plant size, and on the one hand return on investment, and on the other hand net profit in dollars per year. It is this pair of curves which gives management its clearest picture of the product's future. If management wishes to make a certain minimum return on the investment in its plants, the curves

immediately show whether this figure can be achieved and what the minimum size of plant required to reach the required return. They also show the return that is possible if managemnt is willing to gamble on the accuracy of the market analysis and build a larger initial plant than the minimum. It must be remembered, of course, that these curves represent costs for single unit plants, until point B (Fig. 1) is reached, not multiples of smaller plants. Further the curves tell management what the ultimate sales of the chemical will be in quantity and give an idea of the net profit that will be achieved. For a growing concern, such forecasting is of utmost importance.

Another result can be read from these curves when they are constructed before a pilot plant is built. At that time their accuracy is not as great as in later revisions but they give an indication of the profitable initial commercial plant size. This leads to a logical pilot plant size from which the scale up to the first commercial unit will not be too great. In some cases it may enable a pilot plant to be built which can show a small profit.

Unless data of this sort are developed, management seldom has the information necessary to make intelligent decisions on pilot plant and initial commercial plant size. True, in many companies information of this type is thought out informally, but it appears valuable to formalize the presentation to management and actually derive the curves on paper.

ULTIMATE CAPACITY

It has been mentioned that such curves as those shown above enable a company to forecast the approximate ultimate volume of sales and profit from a new chemical. This is true but the curves fail in that they do not develop mathematically or even with critical analysis, a time versus capacity development for the product. Here the economist and the market research man must step away from a straight mathematical approach and deal not only with more intangible figures but with a more idealized approach. The method to be discussed merely represents an ideal and seldom can be achieved. It does, however, represent a form in which forecasts can be presented to management after they have been derived from an empirical examination of the available data and from a trial and error evaluation of the various possibilities.

Since this presentation is somewhat idealized, assume that the market research analysis can give a rough idea of the sales that can be achieved, for a given sales price, in the first few years after the new product is introduced. Such a set of data is shown graphically in Fig. 4. It should be noted here that the data used previously in deriving the first three illustrations is that shown at time A on Fig. 4. In other words it is assumed that it takes two or three years before a stable sales quantity is reached, for any specific price at which the product is introduced. In general it can be said that a new product has a slow start saleswise, catches on and sales rise fairly rapidly, and then the increase in sales tapers off as most of the readily available markets become saturated. As a long-time trend sales will

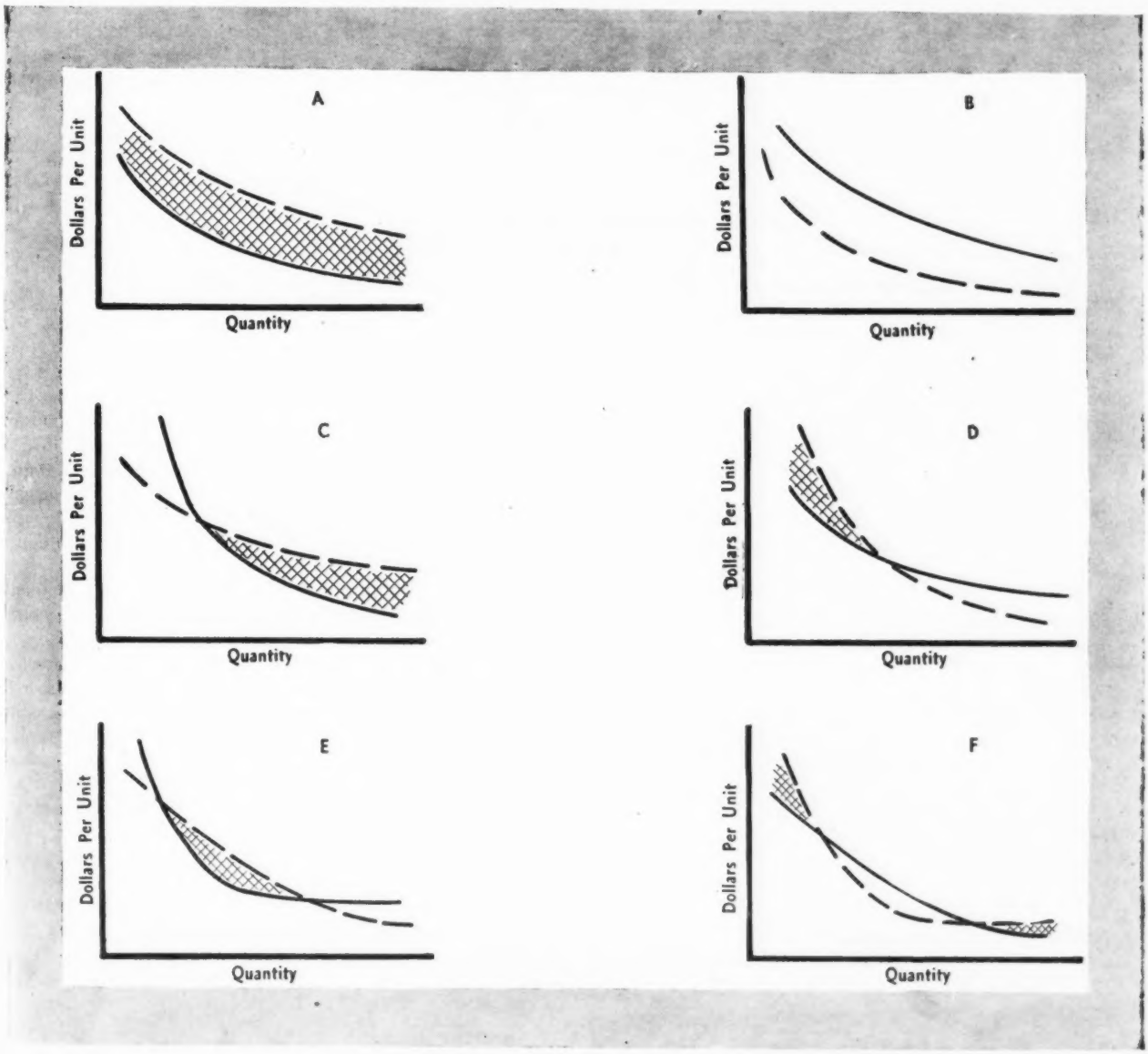

Fig. 2—Solid lines represent cost vs. production, dotted lines sales vs. price. Cross hatched areas show profitable production ranges.

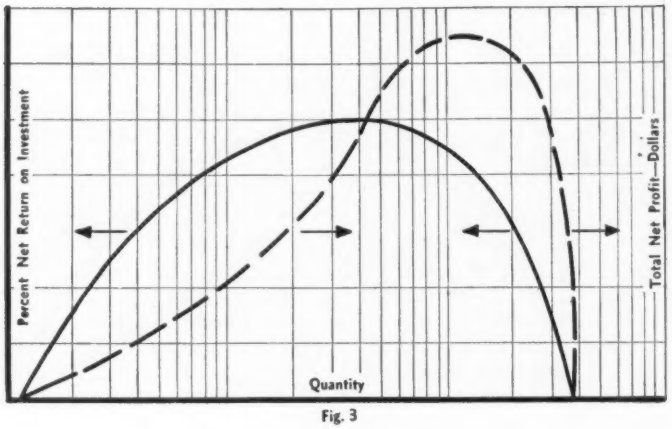

Fig. 3

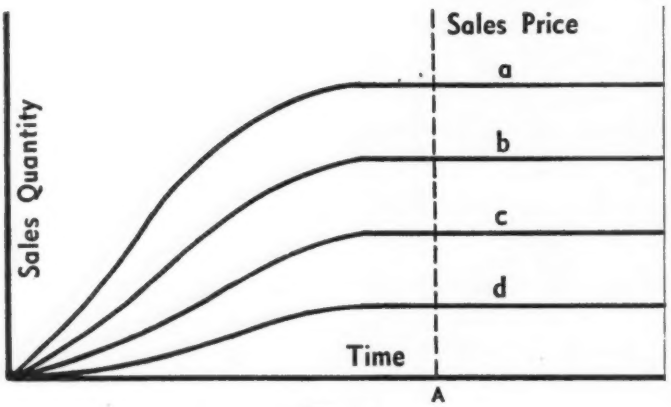

Fig. 4

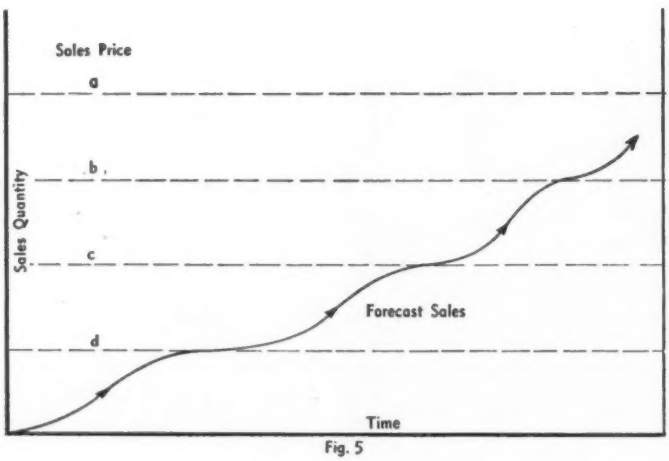

Fig. 5

show a gradual increase after this point, but such an increase can seldom be predicted by a market research analysis. Assuming that such a set of curves as those shown in Fig. 4 can be derived with fair accuracy, it should be possible to use these data to forecast actual sales for, say, ten years ahead. Many considerations will have to be brought in at this point, the extent to which the company is willing to gamble on the initial plant capacity, the ultimate sales volume which looks probable (Fig. 3), the availability of finances and manpower, etc. Assuming that all these diverse forces can be reconciled, a forecast such as that shown in Fig. 5 should be possible.

WHY USE LONG RANGE FORECASTS?

It will be asked immediately why long range forecasting, when of such dubious validity, is valuable. The experience of many companies has been that long range forecasts of the company position are of very great value. They indicate how much profit will be available to put into a research program, so that such a program may be stabilized over a long period. They indicate the future capital requirements of the company so that the necessary funds will be available when the need arises. As such these forecasts can influence dividend policy. They can directly influence the size and growth of the sales force, anticipating sales increases far enough in advance to be able to give adequate coverage to the expected new outlets. These are only a few of the results such forecasting may give. If forecasts of the growth of new products are not considered along with conventional forecasts on existing commercial products the total forecast results may be in error.

It is certainly true that a forecast of this type, dealing with a new product, will not be too accurate. Its value lies in giving *a set* of figures, and a set which has been derived in a logical manner. For any medium sized or large company it is surprising how well the various errors will balance out.

The methods of analysis of new product economics presented in this paper are obviously less mathematical and exact than the methods presented in October. For one reason the figures are based on market research data, and market research itself is considerably less of a factual science than even cost estimating. It is believed, however, that the methods presented have merit in that they can more accurately indicate future trends to management than otherwise. They are not intended to be the final answer, but they are a method of supplying management with necessary information in a form that is easy to understand and use.

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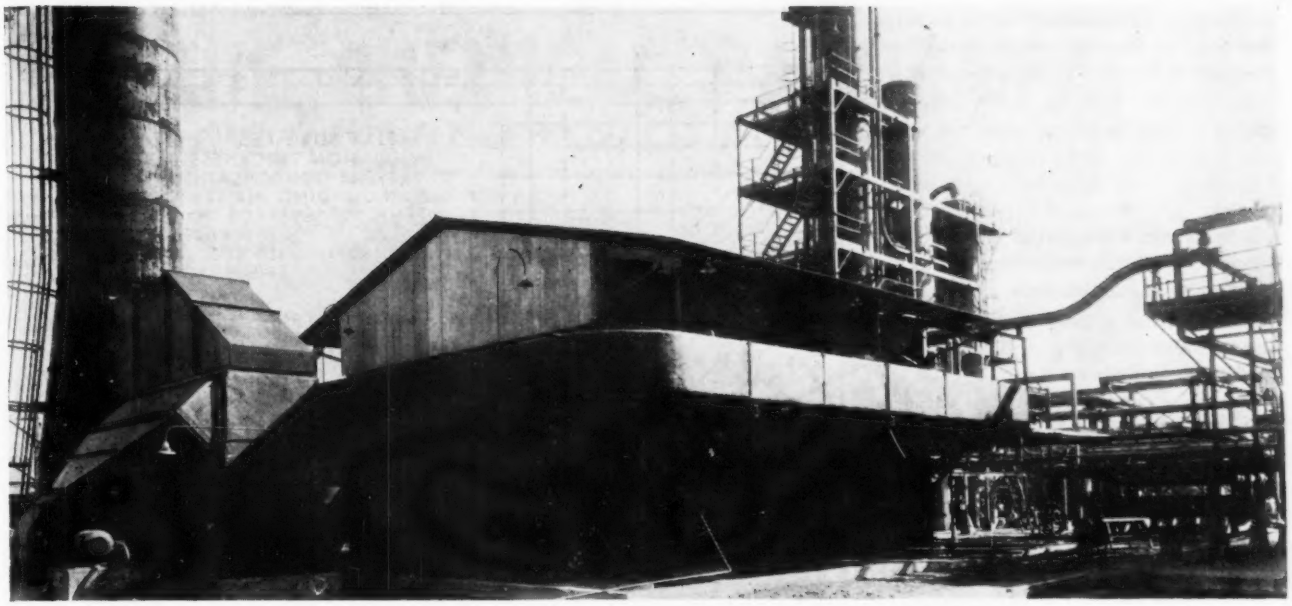


Fig. 1—The insulated duct above carries flue gas from a refinery tubestill to its stack.

Plant Operating Costs Cut By Mineral Wool Insulation of Ducts

EFFECTIVE INSULATION OF DUCTS to be maintained at other than room temperatures is another way to whittle plant operating costs.

SOMETIMES overlooked in the constant search for economies in chemical processing operations is the insulation of equipment that is not always obviously in need of it. One such type of equipment is air and gas ducts, both where the duct contents are (1) warmer and (2) colder than the surrounding atmosphere. For duct work, one of the most common types of insulation is mineral wool.

A case of effective insulation of high temperature ducting is shown in Fig. 1. This duct carries flue gas from a refinery tubestill to its stack. The surface area of the duct is 700 sq. ft. and the temperature of the gas is 620° F.

After insulating with mineral wool the following advantages were noted: (1) flue gas was maintained at a higher temperature and the draft was improved, (2) workmen were afforded protection from the heat, and (3) the duct was weather proofed and hence its life was prolonged.

A more common application of mineral wool duct insulation is in heating systems. Insulation here prevents heat from being dissipated before reaching its destination. Return ducts are likewise insulated to prevent cooler return air from picking up heat from warm areas on the way back to the furnace.

Insulated ducts are also used for transporting cool air for air conditioning purposes. In these cases mineral wool insulation performs the additional function of preventing the deteriorating effects of sweating.

INSTALLATION POINTERS

For inside installations where the temperature gradient is not great, the following installation procedure is recommended:

(1) Clean the duct of all grease and dirt.
(2) Cut the mineral wool blocks to conform to the area to be insulated.
(3) Wire the blocks to the ducts. Wire should be wound around the insulation on approximately 4 in. centers. Galvanized or expanded angles are are recommended to keep the blocks in line at the corners. (See Fig. 2.)

When the temperature gradient is greater than that encountered in room heating and air conditioning, additional steps are advised (Fig. 3). They are:

(1) Trowel a ½ in. coating of mineral wool cement over the surface of the block.
(2) Follow this with a layer of 1 in. mesh poultry netting.
(3) Apply a ¼ in. coating of finishing cement.

In cases where the contents of the duct are at a lower temperature than the surroundings, an asphalt vapor barrier is applied to the insulation exterior. The purpose of the vapor barrier is to prevent atmospheric moisture from permeating the mineral wool and condensing, thereby spoiling its insulating qualities.

Asphalt is also useful in cementing mineral wool blocks to the duct before wiring them in place and in preventing corrosion.

To determine how much insulation is needed to keep the external surface of the

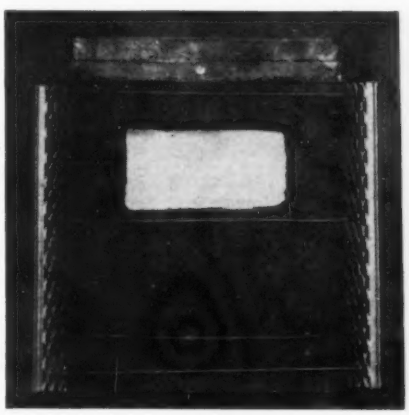


Fig. 2—For low temperature gradient.

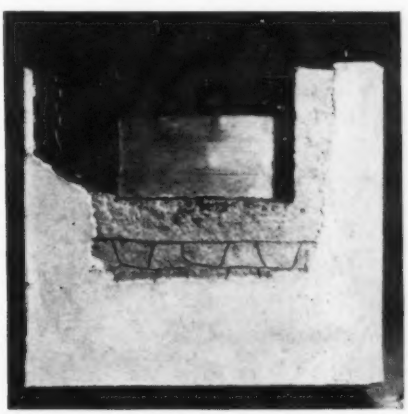


Fig. 3—For high temperature gradient.

insulation at a temperature higher than the dew point of the surrounding atmosphere, the chart in Figure 4 is recommended.

Start at the right, at the relative humidity of the air surrounding the duct; pass horizontally to the diagonal line corresponding to the uninsulated surface temperature (or overall difference between this temperature and that of the surrounding air); then drop vertically down to the required insulation thickness.

In the indicated example, air at 80° F. and a relative humidity of 91.5% will not condense moisture on the surface at 30° F. if over 4½ inches of insulation is used.

The chart may also be used as follows (see heavy black lines): a surface with 3 inches of insulation and cooled on one side by gas at 35° F. will have a temperature on the outside (finished) surface of the insulation just 3° F. less than the ambient air temperature of 80° F., or 77° F.

For further installation data, the reader is referred to the National Bureau of Standards' bulletins: (1) Mineral Wool: Loose, Granulated, or Felted Form, in Low Temperature Installations and (2) Mineral Wool: Blankets, Blocks, Insulating Cement, and Pipe Insulation for Heated Industrial Equipment. These bulletins are numbers CS-104-43 and CS-117-44, respectively.

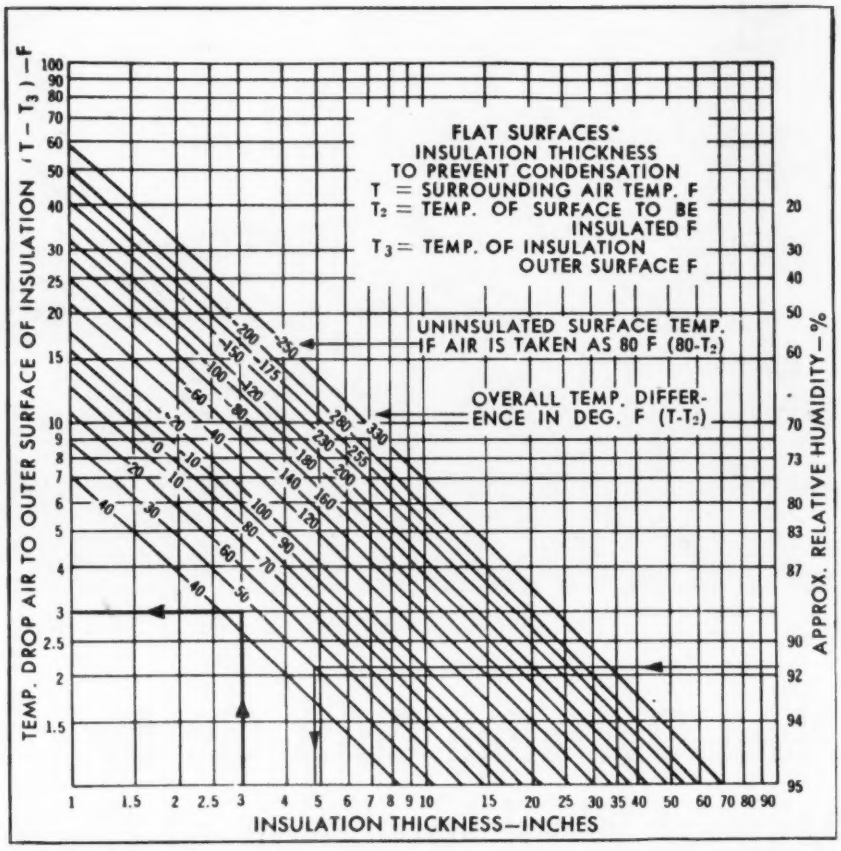

FLAT SURFACES*
INSULATION THICKNESS
TO PREVENT CONDENSATION
T = SURROUNDING AIR TEMP. F
T2 = TEMP. OF SURFACE TO BE INSULATED F
T3 = TEMP. OF INSULATION OUTER SURFACE F
UNINSULATED SURFACE TEMP. IF AIR IS TAKEN AS 80 F (80-T2)
OVERALL TEMP. DIFFERENCE IN DEG. F (T-T2)
TEMP. DROP AIR TO OUTER SURFACE OF INSULATION (T - T3) - F
APPROX. RELATIVE HUMIDITY - %
INSULATION THICKNESS—INCHES

Fig. 4—Chart for determining thickness of mineral wool insulation required on ducts.

Lactic Acid Resins

Various resins based largely on lactic acid have been developed in the Division of Dairy Research Laboratories of the Bureau of Dairy Industry. They may be of interest to the coatings industry. It has been estimated that the whey produced annually as a byproduct in the manufacture of casein and cheese is a potential source of about 400 million pounds of lactic acid.

The chemical properties of lactic acid make it possible to form useful resins when reacted with other compounds such as aldehydes, esters, carbohydrates, fatty oils and metal salts. Heat is used to remove water from the lactic acid which then reacts with the various agents.

The most practical of these resins is formed by reacting dehydrated lactic acid with fatty oils such as castor oil, linseed oil, or modified drying oils at temperatures of about 510° F. to 535° F. until a soft brown, elastic product is obtained. The resin is dissolved in suitable solvents to form a solution containing about 20% of resin. After addition of driers a lacquer is obtained which produces a hard, infusible, flexible coating when baked for 15 minutes at 390° F.

Favorable results were reported as follows by various commercial organizations which cooperated with the Bureau in testing this resin as a metal coating. Evaporated milk cans coated with this resin imparted less off-flavor to milk than cans coated with a commercial coating and did not show the impairment which occurred in the latter. The coating was superior to tin when used in service on cottage cheese pails. The hardness of the coating was acceptable, it was not affected by the alkalies used in dairies and its flexibility was superior to that of a phenolic coating. The coating had sufficient water and reagent resistance to warrant its use in the interior of food cans where its non-toxic and superior elastic properties would be useful.

Field tests made by the Bureau, in which milk was transported in 10-gallon steel milk cans coated with this resin, demonstrated that it compared favorably in durability with several other commercial organic coatings.

It has been found that this coating may be further improved by the addition of small amounts of resins derived from coal tar and petroleum.

A novel type of resin is one in which a small amount of metal (fractions of 1% to about 6%) is combined with polymerized lactic acid. These resins have been named metal polylactyllactates. They are made by reacting lactic acid with soluble metal salts of such metals as aluminum, chromium, cobalt, copper, iron, manganese, lead and zinc, or combinations of these metals by heating for several hours at temperatures up to 485°F. These resins may also be made in a process using very little heat by the addition of reactive anhydrous metal chlorides to dehydrated lactic acid.

This type of resin may be obtained as a pale, infusible solid which is readily converted into lumps or an almost colorless powder. When dissolved in organic solvents the coatings generally air-dry rapidly, but for good water resistance should be baked for about 15 minutes at 365°F. Excellent light colored, tough, water-resistant coatings suitable for protective and decorative purposes may be formulated. Attractive pigmented coatings baked on iron articles such as cigarette lighters and pencils have held up well while in daily use for a period of 8 months. Alone or modified with other resins, plasticizers and filters, these metal polylactyllactates are suitable for a variety of uses.

THE CHEMICAL PANORAMA

NEWS OF THE CHEMICAL PROCESS INDUSTRIES IN PICTURES

PEOPLE

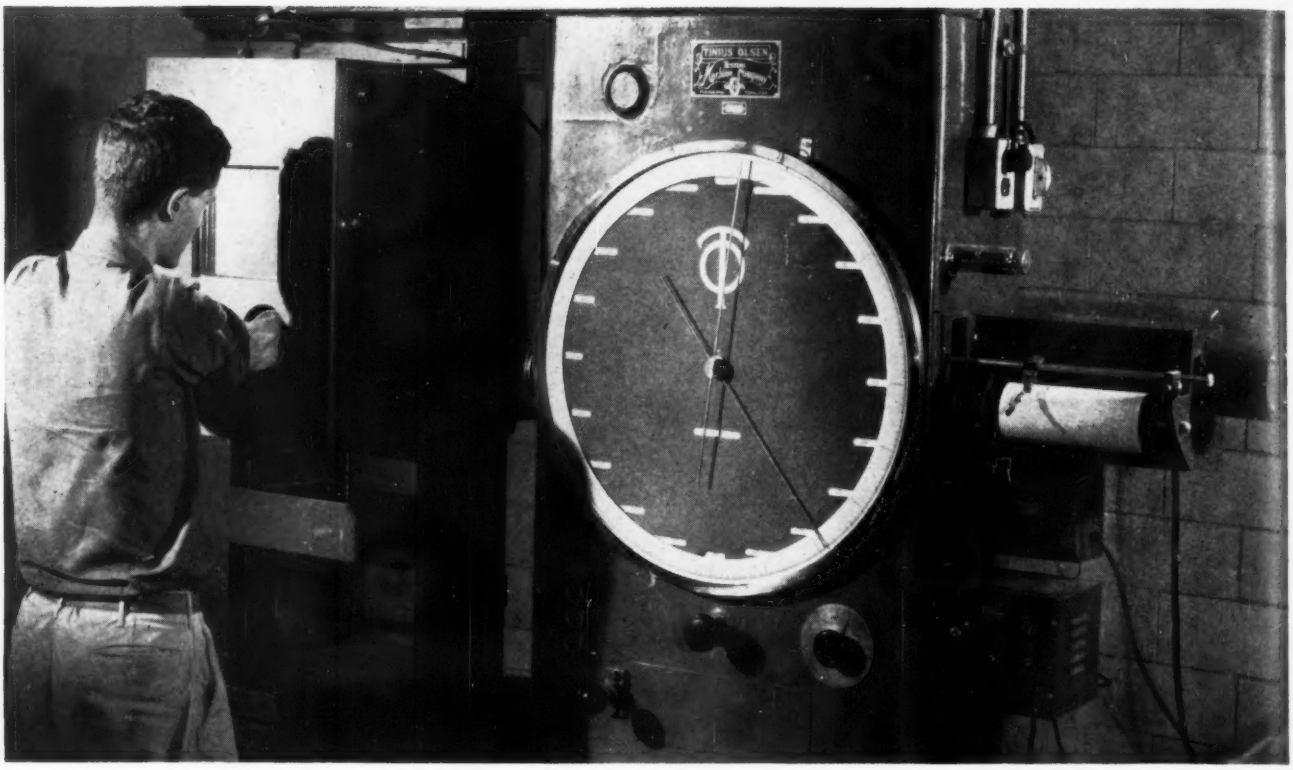
F. M. Hildebrandt, appointed director of laboratories, U. S. Industrial Chemicals Inc. He received his Ph.D. from Johns Hopkins, and has been associated with USI since 1924.

Henry L. Pierson (left) and Thomas R. Vaughan, elected secretary and vice-president respectively, by the Freeport Sulphur Co. They will assume their new duties immediately.

William M. Lee, new supervisor, special products division, Pennsylvania Salt Manufacturing Co.

Harold H. Reed, named manager of the N. Y. district, Air Reduction Sales Co. He succeeds W. Schoenthaler.

James H. Lum, chosen managing director of Monsanto (Australia) Pty. Ltd. He was formerly executive director for Monsanto at Clinton Laboratories, Oak Ridge, Tenn.

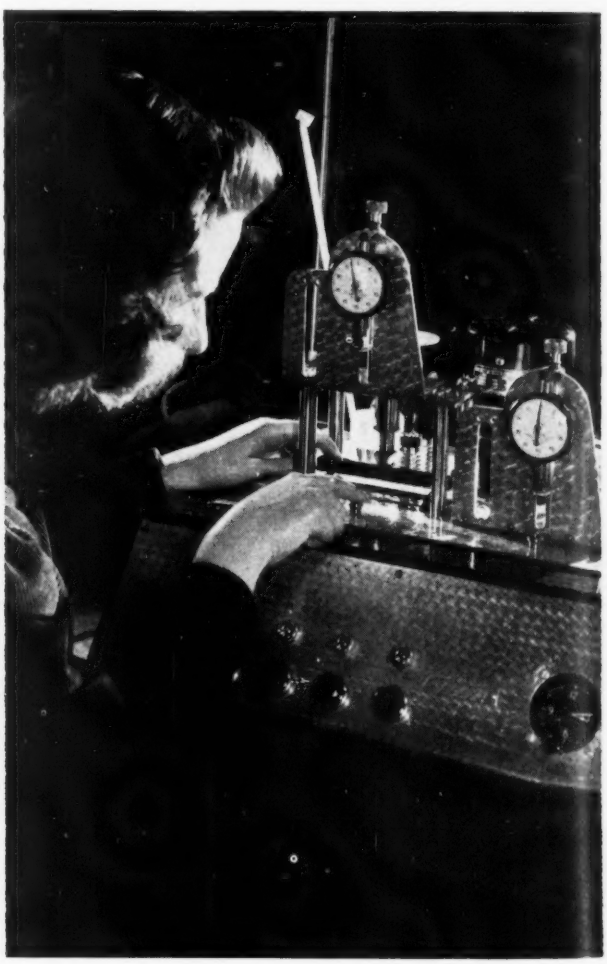


The flexural strength and modulus of elasticity of a resin is being measured here at elevated temperature. Temperatures over a range from —100° to 250° F. can be maintained in the insulated box which surrounds the sample. ASTM methods are supplemented by special procedures.

Probing Polymer Properties

Chemical structure is the fundamental key to resin properties, and the relation between composition and physical behavior is the problem which engages the attention of research workers in that field. How various phases of this underlying problem are attacked in the laboratories of Resinous Products & Chemical Co. and the Rohm & Haas Co. is shown here. Determination of strength, hardness, optical clarity, abrasion-resistance, heat of reaction, molecular weight, boiling and freezing points, ultraviolet stability, and dielectric properties provide valuable data for the enlightenment of the many branches of industry employing synthetic polymers. And as information accumulates and is correlated, resin technology becomes less and less of an art, more and more of a science.

The tendency of a resin to flow is determined by deflection of a standard-size resin specimen placed under load. It is placed under oil, the temperature of which is raised at a regular rate. Flowing tendency is rated as the temperature at which the sample is deflected 0.010 inch.



The Scott IP-4 tester measures the tensile strength and extensibility of resin films and sheets under cycles of applied and released stress, thus determining hysteresis loss. The same tester is used to evaluate wet and dry strength of resin-coated papers, and tackiness.

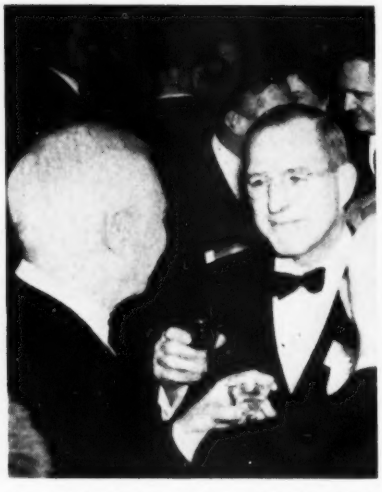
The haze meter measures comparative particle size in emulsions and dispersions by loss of light intensity through scattering.

Infrared radiation, passed through resin solutions in this spectrometer, is diffracted into a spectrum. Transmission at each wave length is characteristic.

Here a cast resin is subjected to a Charpy impact test, which evaluates toughness and sensitivity to stress concentrations at cracks and corners. This procedure is like the Izod test.

Diffraction of X-rays by crystalline materials produces characteristic patterns. Here a catalyst crystal is being studied. X-ray absorption identifies resin types, measures the thickness of organic coatings.

C. M. A. Stine presents the William H. Walker Junior Award to Harry G. Drickmar, University of Illinois, and Harry H. Hummel, of the University of Wisconsin.

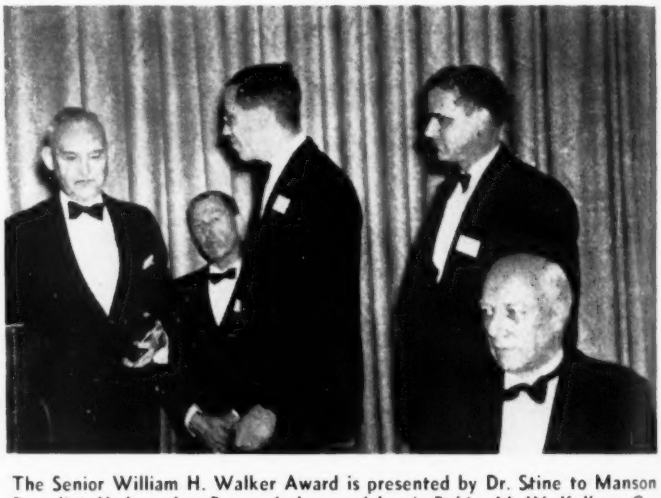


Harvey M. Merker (right), of Parke, Davis & Co., general chairman of the meeting, toasts A. H. White, honorary chairman.

An unscheduled but warmly-received feature of the banquet was a "recital" by Calco's engineer-baritone, M. N. Gaboury.

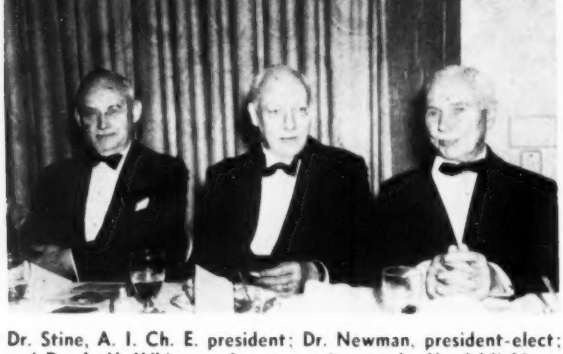
Engineers at Detroit

Breaking all former attendance records, the 40th annual meeting of the A.I.Ch.E. at Detroit last month drew more than 1600 registrants and their wives from all parts of the country. At the meeting Dr. Albert B. Newman, professor of chemical engineering at the College of the City of New York, was elected president of the Institute for the year 1948, succeeding Dr. C. M. A. Stine of the Du Pont Company. Elected vice-president was Francis J. Curtis, vice-president of the Monsanto Chemical Co. Stephen L. Tyler and C. R. DeLong were re-elected executive secretary and treasurer respectively. The following members were voted directors of the Institute: M. C. Molstad, University of Pennsylvania; John J. Healy, Jr., Monsanto Chemical Co.; William T. Nichols, Westvaco Chlorine Products Corp.; and William I. Burt, B. F. Goodrich Chemical Co., Cleveland, Ohio.



The Senior William H. Walker Award is presented by Dr. Stine to Manson Benedict, Hydrocarbon Research, Inc., and Lewis Rubin, M. W. Kellogg Co.

Speakers at the Fischer-Tropsch symposium: Max Leva, H. H. Storch, and W. C. Schroeder, U. S. Bur. of Mines; W. W. Akers, U. of Mich.; Sol Weller and L. D. Schmidt, Bur. of Mines.



Dr. Stine, A. I. Ch. E. president; Dr. Newman, president-elect; and Dr. A. H. White, professor emeritus at the U. of Michigan.

C. E. K. Mees, vice-president and director of research at Eastman Kodak Co., addressed the banquet session on the subject "The Scientist and Society."

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An alkyl aryl sulfonate prepared in dry flake form is now being sold by Publicker Industries, Inc.

Surface active agent HHS is an excellent wetting, spreading, leveling and foaming agent. It is stable in hard water and will disperse calcium soap. Displaying good emulsifying properties, this detergent is active in acid or alkaline solutions as well as in hard and soft water, and therefore finds wide application in the processes used by the textile, paper and leather industries.

It may be used advantageously alone or with other substances to produce liquid and powdered cleansing materials for the metal, food, dairy, sanitary supply and household cleaner supply industries.

Black Dye Aids NP 568

Edwal Laboratories, Inc., is now marketing commercial grades of phloroglucinol, methyl phloroglucinol and traiminotoluene.

These materials are valuable as coupling compounds in the development of fast black dyes. In dyeing certain synthetic fibers phloroglucinol develops a dye with good fulling properties, good fastness to light and washing, and high tinctorial power.

Extra-Fine Silica NP 569

A silica powder of submicroscopic fineness is now available in pilot-plant quantities from Linde Air Products Co. This unique material is characterized by an upper particle size of 0.05 microns and by a high degree of chemical purity, suggesting many uses associated with surface phenomena. It is sold under the trademark "Linde."

Stable suspensions of this silica can be formed in water and in many organic liquids, and proper selection of concentrations lead to the formation of stable or thixotropic gels, dilatant liquids, and other colloidal systems. It disperses well in many plastic materials, giving reinforcing strength and aiding in pigment dispersion. This silica is sold in 1, 5, and 10-pound lots and may be used in such diverse industries as paint, chemical, pharmaceutical, plastic, rubber and textile.

Temporary Protective Coating NP 570

A new type of temporary protective coating for use on stainless steel, aluminum, painted surfaces, glass, and plastic surfaces, is being sold under the trade name Spraylat by the Spraylat Corp.

These compounds are different from the usual type of temporary protective coating compounds in that they are water dispersions of film forming materials. They do not contain volatile solvents, and accordingly are free from any fire hazards or toxicity in spraying.

The material is shipped as a liquid, adjusted before shipping for best spraying conditions. The compounds contain about 3.6 to 3.8 pounds of dry solids or film forming material per gallon. The coverage obtained with Spraylat depends on the thickness of the protective coating applied. For withstanding all abuse received in an average factory, a film thickness of .003" plus has proven satisfactory. This thickness of coating can be deposited with one application to obtain a coverage of 200 square feet per gallon, under average spraying conditions.

The character of the film when dry is a tough, abrasive resistant, elastic, protective coating, adhering to the surface strongly, permitting all machining operations to be performed such as drawing, drilling, bending; yet the film can be removed by a steady pull when desired.

Solubilizer For Chlordan NP 571

Chlordan, an organic insecticide, is now soluble in water as a result of the development of a new solubilizer by Griffin Chemical Co.

Called Trex 80, the solubilizer, or emulsifier, is used in 50/50 concentrations which can be readily diluted with water of any hardness to produce colloidal solutions ranging from clear to opalescent and at any desired level of chlordan content. These solutions are non-settling, assuring a uniform percentage of chlordan in the spray.

Emulsions of chlordan can also be prepared by reducing the Trex 80 content. Both solutions and emulsions have been used effectively in the field. Both eliminate phytotoxicity, odor and fire hazard of hydrocarbon solvents.

Disinfectants NP 572

Carvacrol is a liquid phenol with properties similar to thymol. Having a phenol coefficient of 25, it may be added to products having a solvent effect. It may be used as a preservative for textile soaps or gum solutions, as a mold inhibitor or as an odor preventive. It becomes more active against *Staphylococcus aureus* in hot water.

Chlorcarvacrol is a high melting solid with a fine odor resembling thymol and chlorthymol. Its phenol coefficient is roughly 100. Besides high disinfectant power this product shows excellent preservative qualities.

Both are manufactured by Orbis Products Corp.

Polyoxyethylene Fatty Esters NP 573

Commercial production of a long line of products extending practically throughout the entire range of polyoxyethylene fatty esters has been begun by Glyco Products Co.

Ranging from liquids of low freezing point to waxy solids and from water solubility to hydrocarbon solubility, these esters are being applied in the manufacture of emulsions, dry cleaning soaps, cosmetics, pharmaceuticals, lubricants, textiles and plastics.

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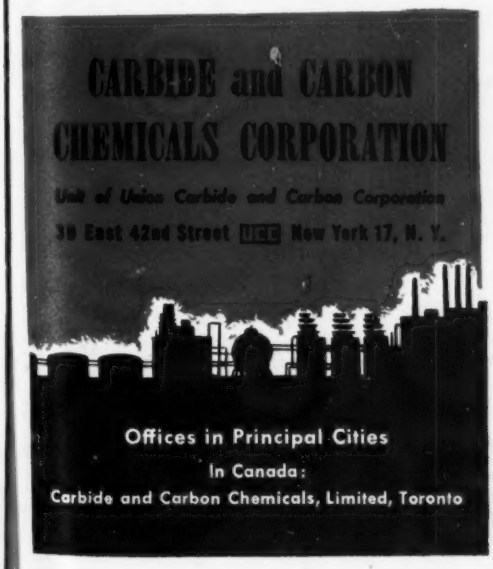
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SO_2
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Odor	Characteristic, pungent
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Boiling point	14.0° F. (−10.0° C.)
Density of liquid at 80° F.	(85.03 lbs. per cu. ft.)
Specific gravity at 80° F.	1.363
Density of gas at 0° C. and 760 mm.	2.9267 grams per liter (0.1827 lb. per cu. ft.)
Critical temperature	314.82° F. (157.12° C.)
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They are used with quaternary ammonium disinfectants to increase detergency. Others are excellent emusifying agents for hydrocarbons and insecticides, even under the severe conditions of solutions that contain acids and electrolytes.

Also, products of this unusual series are lubricants for textiles, rubber and plastics, plasticizers for synthetics and plastics and spreading and dispersing agents.

The wide range of physical properties achieved by these non-ionic surface-active agents results from varying their molecular structure. The variations occur in the polyoxyethylene chain length, in the type of fatty acid used, and in their ratios.

Polydiaryl Amines NP 574

One member of a new family of resins useful in the rubber, paint and plastic industries is now available in carlot quantities from Benson Process Engineering Co. PDA-10, because of its lower price, is used as a replacement for customary antioxidants such as phenyl-beta-naphthylamine.

PDA-10 is a viscous liquid, amber in color, possessing a characteristic aromatic odor. Its average molecular weight is approximately 400. Though its large scale industrial use has been as an antioxidant in both natural and synthetic rubber, this product is of utility as a stabilizer and polymerization inhibitor as well as a plasticizer.

2-Nitrothiophene NP 575

Of interest to the pharmaceutical and dye industries is the appearance on the market of 2-nitrothiophene, manufactured by Arapahoe Chemicals, Inc.

The fine grade is a pale yellow mass of needles, having a pungent odor resembling nitrobenzene. The technical grade is a darker crystalline mass, containing a small amount of liquid. Nitrothiophene is cast in the bottles. Its low melting point allows easy removal by heating the product in a water-bath and pouring out the yellow liquid.

The nitro group of nitrothiophene undergoes the reduction reactions characteristic of aromatic nitro compounds.

Wax Improver NP 576

A series of new products designed primarily for blending with other waxes are the Arwaxes, concentrates of polyisobutylene in either fully refined paraffin or microcrystalline wax. They may be readily dissolved or melted in the ordinary wax tank by the paper converter without any change in standard equipment.

Arwaxes may be used for up-grading tensile strength, improving wax stability,

Flame Resistant

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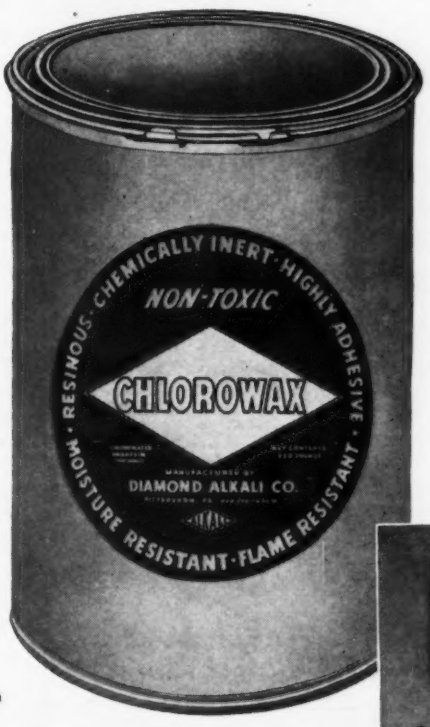
Chlorowax is widely compatible with resins, rubbers, vegetable oils, natural waxes, and improves vapor resistance of some resins.



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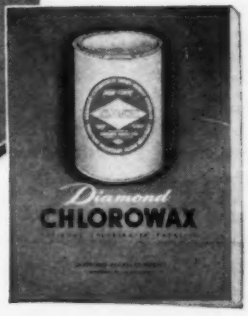

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TODAY, odor plays a role of increasing importance in the broad field of plastics. But well fixed, heat resistant aromatics and practical methods of incorporation had to be developed before this was possible. Now, articles made of plastic—raincoats, upholstering materials, ladies' handbags, tobacco pouches, plasticized undergarments and countless other items of every-day use—are bought and enjoyed with never a thought to the unpleasant odor that skillful masking has successfully eliminated. Thus, the modern and versatile plastic gains added sales momentum —*at negligible cost*—through the use of appropriate aromatics. Which suggests the possibility that . . .

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Perhaps we can correct certain odor problems afflicting *your* products or your industry. It will obligate you in no way to let us try. And if we do succeed, you will gain as have all others who have seized upon the advantages of odorant, deodorant or neutralizer to render their products more attractive. . . . A letter describing your odor problem in full detail will enable us to reply promptly and—we hope—satisfactorily to your query. Why not write us today?

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moisture-vapor-proof flexible coatings for paper and plastic films, heat seal coatings, dental waxes, chewing gum bases, pressure tapes and emulsions, fruit and vegetable coating, and rust preventives. They are made by the American Resinous Chemical Corp.

Food Canning Process NP 577

Better tasting canned foods result from a new process involving less heating. Liquid or nearly liquid foods, such as cream style corn, are pumped through pipes surrounded by superheated steam and quickly heated to 290 degrees Fahrenheit. The product is then rapidly cooled to about 150 degrees and sealed in sterile cans under aseptic conditions.

Because of the unusually short period of heating to which the products are subjected, a great improvement in quality results.

Micro-organisms are easily killed in acid foods, but vegetables and other products that are neutral must be heated for considerable periods of time at temperatures of 240 or 250 degrees F. to prevent deterioration in the can.

The vegetative micro-organisms of acid products, such as fruit juices and wines, are killed in a few seconds at 170 degrees as in flash pasteurization, and if they are canned or bottled while still hot, no further heat treatment is necessary. The new process was developed by Dr. Donald K. Tressler, food consultant, of Westport, Conn.

Sodium Carboxymethylcellulose NP 578

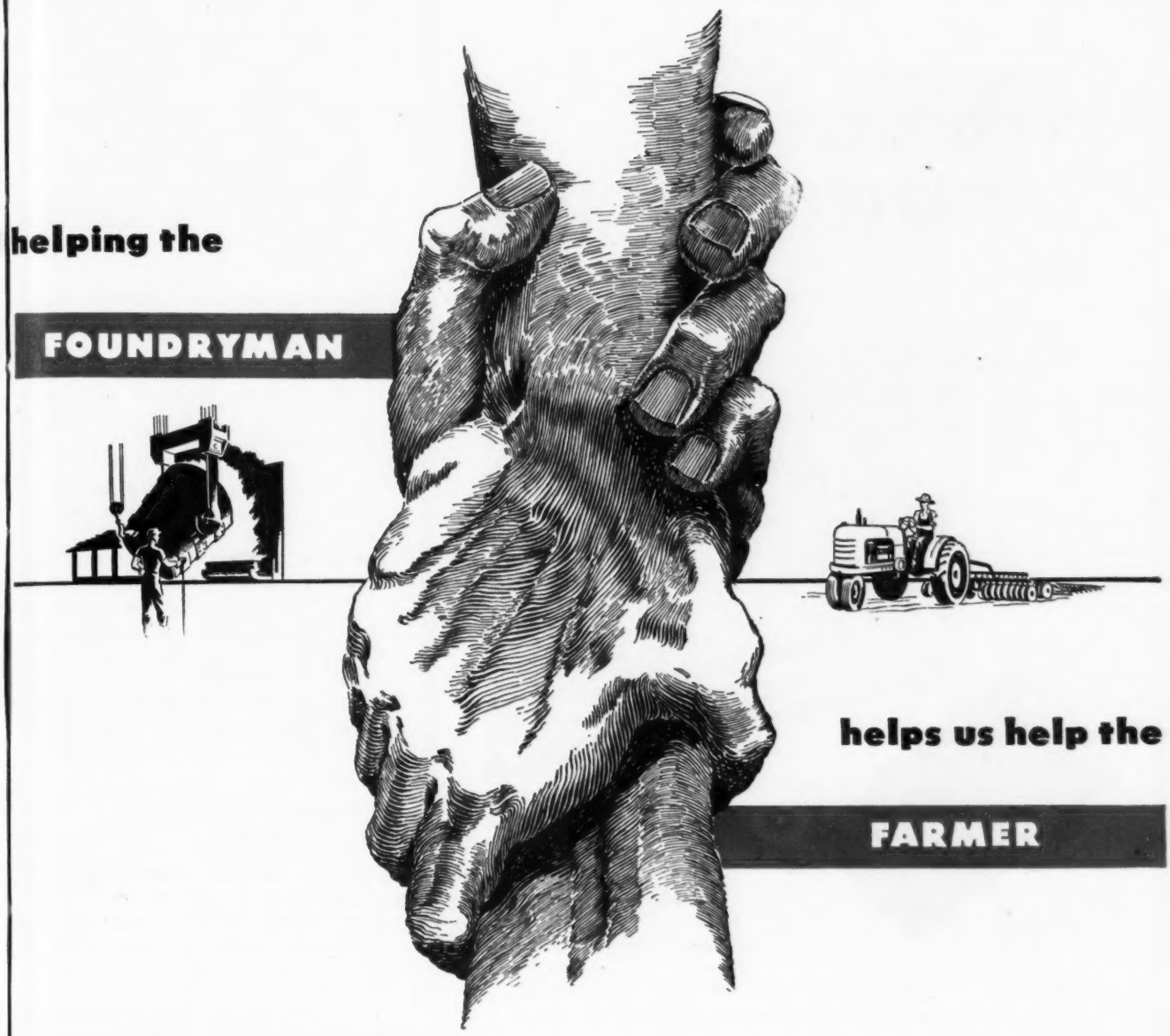
Wyandotte Chemicals is now manufacturing commercial quantities of Carbose, a technical grade carboxymethylcellulose. When Carbose is used with certain synthetic detergents, their laundering performance equals and in many cases excels that of the best grades of soap.

Sodium carboxymethylcellulose may be deposited as a sizing on fabrics, or used as a print base. It is an adhesive, and a thickening and suspending agent and is finding application in oil well drilling muds, in paper and in paint, and in the processing of ceramic materials and the molding of plastics.

Radar for Food Processing NP 579

The use of radar to sterilize food promises more nutritious and better tasting canned and packaged products, according to the Hartford-Empire Co. Bacteria that cause food to spoil can be destroyed in a few seconds by high-frequency radar or radio waves, which generate sudden heat within the food.

Rays of high-speed electrons may also be applied commercially to food steriliza-



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tion, but this method, known as the cathode ray technique, may prove useful only for small packages because the rays' power of penetration is limited.

Electron waves attack food bacteria directly without heating the food. They represent a potential hazard to workers, however, and require adequate safety measures when employed commercially.

Other methods of food sterilization, such as ultra-violet light, ultrasonics, and electrolysis, have serious drawbacks which preclude their commercial use at present.

Isopropyl Alcohol for Anti-Freeze Formulas NP 580

The Celanese Chemical Corporation has announced that it is now supplying 91 per cent isopropyl alcohol, technical, to anti-freeze producers. With low acidity and alkalinity, this alcohol has slightly better freezing point properties than the refined 91 per cent isopropyl mixtures with water. In the new product the bulk of the remainder is n-butyl formal.

Tank car quantities are available from the Celanese chemical plant at Bishop, Texas, and the quotations are 37c per gallon in seller's tank cars; 46½c per gallon in carload drums, and 49½c per gallon less carload lots, f.o.b. Bishop, Texas, freight allowed to destination.

Oxidation Catalyst For Aromatics NP 581

A new silica gel oxidation catalyst is being offered by The Davison Chemical Corp. While not yet in general use, the catalyst has shown successful results in the oxidation of naphthalene to phthalic anhydride.

The material is available in various mesh sizes. Additional suggested uses are for the oxidation of xylene to phthalic anhydride, benzene to maleic anhydride, and cyclohexanol to adipic acid.

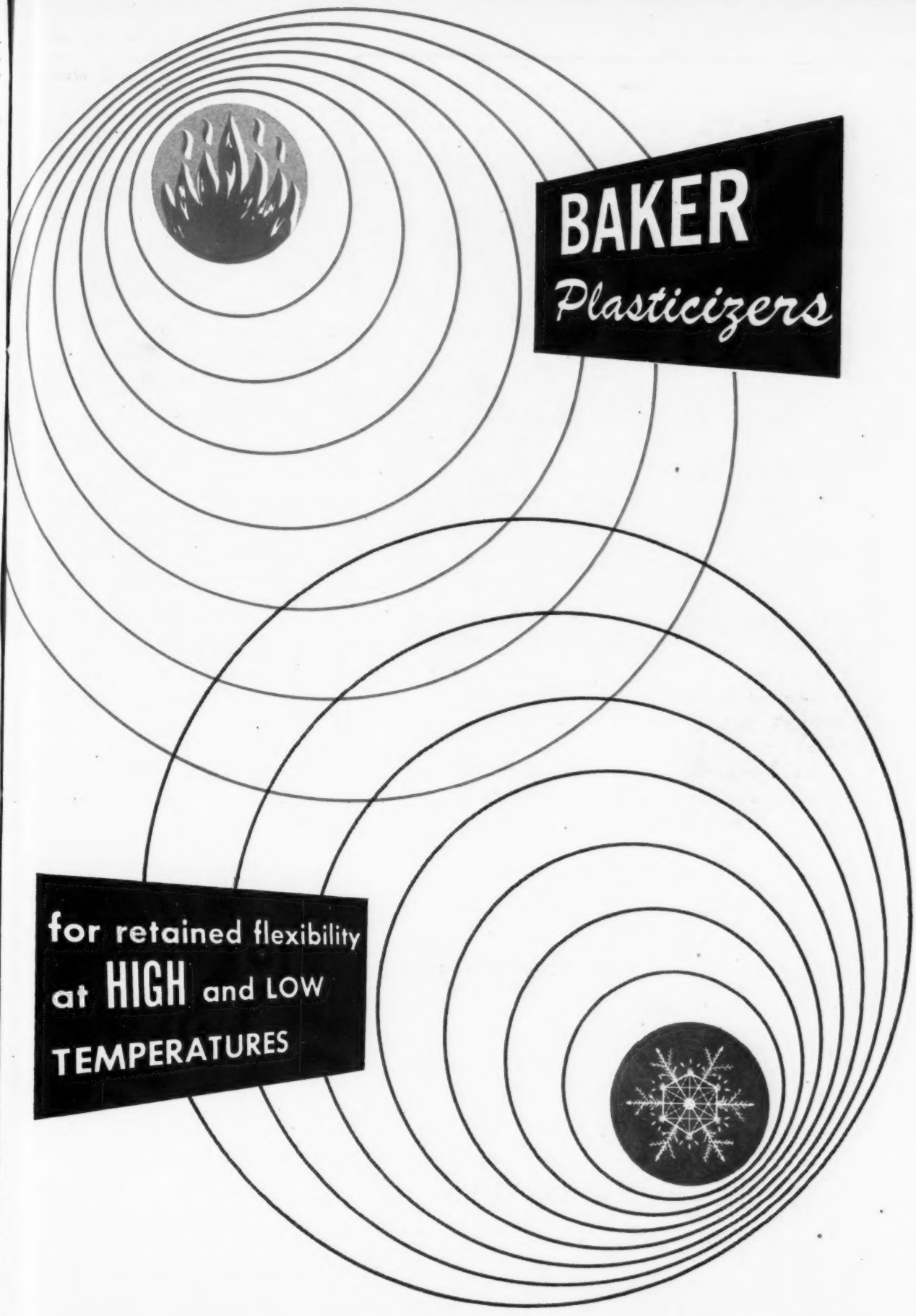
Aluminum Corrosion Resistance NP 582

Alodine, developed in the laboratories of the American Chemical Paint Co., provides high corrosion resistance for aluminum and a lasting bond for organic finishes. Use of this product combines simplicity of procedure and economy in time, materials, labor and equipment with the effectiveness of anodic oxidation.

In the process, the metal is not merely cleaned or etched but is chemically coated. This coating compares favorably in both its metal-protective and paint-bonding qualities with the best types of protective coatings hitherto available.

Protective Coating NP 583

Vinyl-Clad is a new acid- and alkali-resistant protective coating made by the Plastic Lining Corp. It is a modified



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copolymer of vinyl chloride and vinyl acetate, resin plasticized, held in the liquid state by means of an aromatic ketone.

This product is tough enough to resist abrasion, yet expands and contracts readily without cracking. Exhibiting excellent dielectric properties, it does not chip.

It may be applied by brushing, spraying, or dipping to such materials as metals, concrete, linoleum, wallboard, tile, canvas, and molded plastics. Vinyl-Clad may be air-dried or baked. It is available in the primary colors, black, white, gray, aluminum, and clear.

Oil-Resistant Synthetic Rubbers NP 584

Two new oil resistant rubbers have been introduced by B. F. Goodrich Chemical Company. Designated as Hycar OR-25 EP (Easy Processing) and Hycar OR-25 NS (Non-staining), these rubbers have superior processing characteristics over the regular Hycar OR-25. Hycar NS differs from Hycar EP only in that a different anti-oxidant has been added to the former, making it non-staining and non-discoloring. This is an advantage in the fabrication of light-colored products.

Preliminary investigation with these new Hycar rubbers indicate that to obtain an equivalent state of cure to the regular OR-25, the quantity of sulfur should be increased by 0.25 parts of sulfur to 100 parts of rubber polymer.

Cement Sealer NP 585

A new concrete waterproofer and pore sealer called Concretite 461-30 is a clear liquid manufactured by American Resinous Chemicals Corp. Being based on a copolymer resin it deposits a tough, transparent, durable film with excellent adhesive and tensile strength.

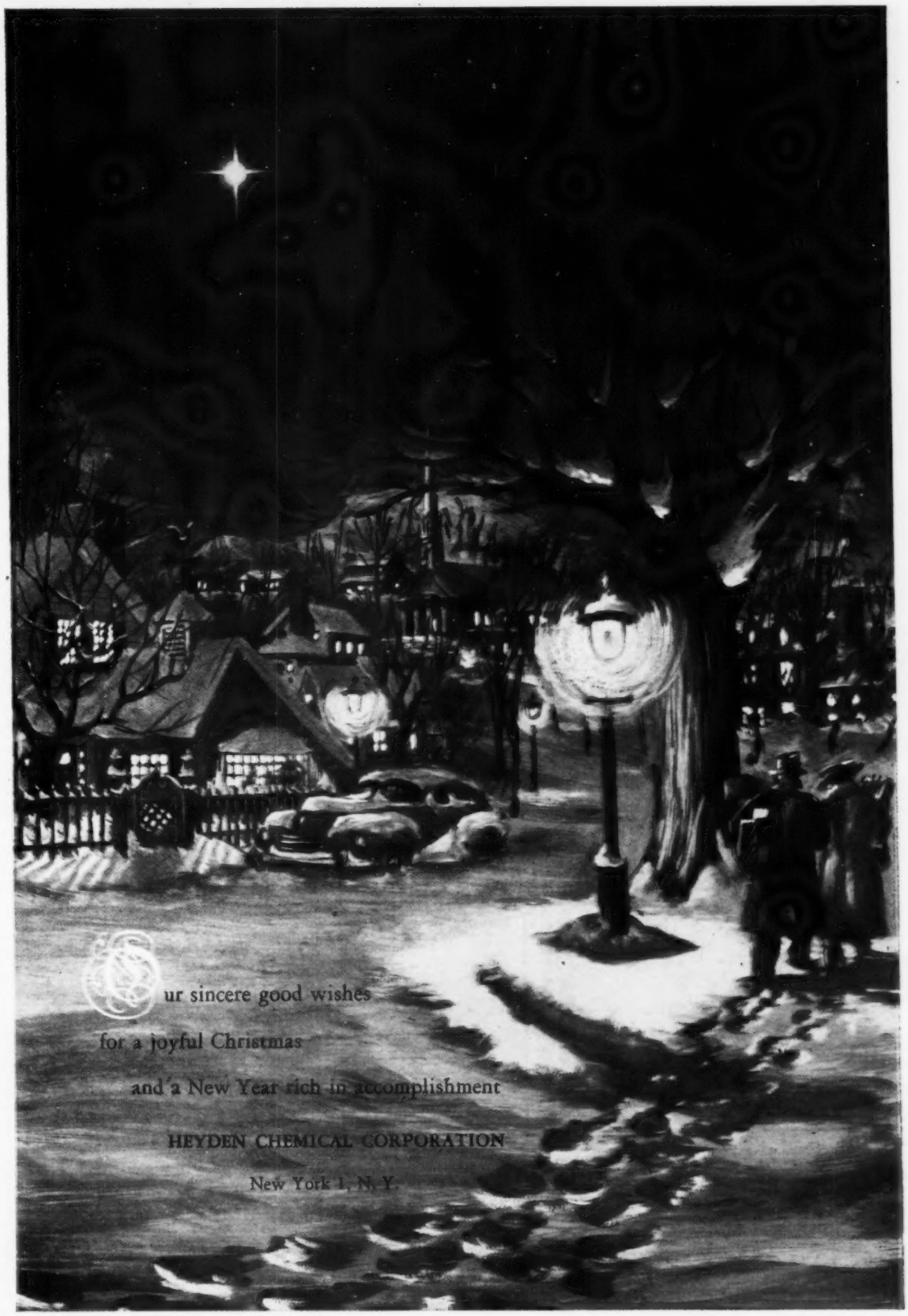
For general use it is diluted down to 15% solids with VM and P naphtha or xylol and applied by brush. Three pints of Concretite diluted with five pints of solvent will result in approximately 15% solids.

The surface to be treated should be clean and dry before being coated. On concrete and similar stone structures, Concretite fills the pores with its tough film, minimizes seepage of water, and prevents dusting of the concrete by abrasion.

In general, one coat applied by brush is sufficient. For better waterproof protection, two coats may be used.

Acrylic Elastomer

A new rubber, an acrylic elastomer known as Lactoprene EV, developed by the Department of Agriculture's Eastern Regional Research Laboratory, is now being made on pilot-plant scale by an agent for the Office of Rubber Reserve. It is made by building big molecules from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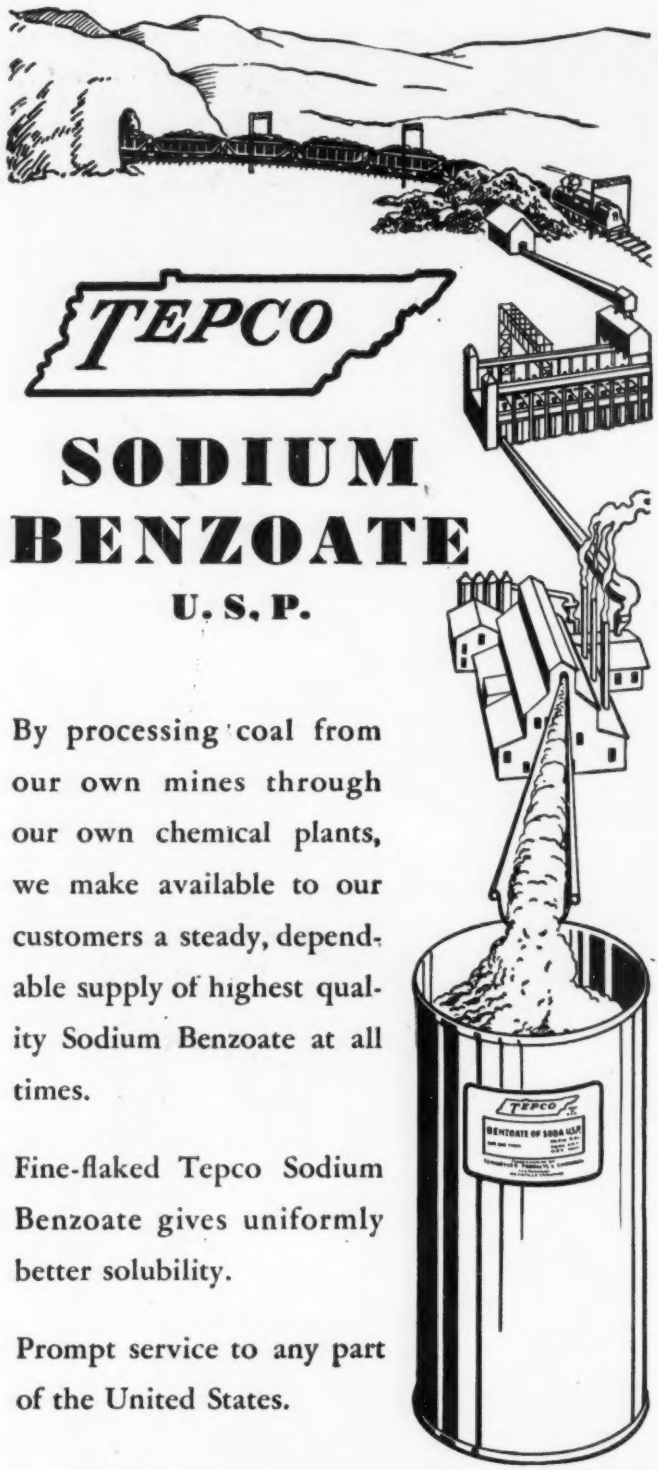

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the smaller ones of a mixture containing 95 per cent of ethyl acrylate and 5 of 2-chloroethyl vinyl ether. Its production is simpler than that of butadiene rubbers because, for one reason, the polymerization can be carried on at atmospheric pressure in one to two hours.

Lactoprene EV can be vulcanized with numerous agents, including sulfur, and many of the accelerators commonly used with natural rubber and with synthetic rubbers, as well as with certain organic compounds. Thereafter the material has excellent dry heat resistance and can maintain its rubbery characteristics even at 300° F. for more than 700 hours. The vulcanized material has unusually long flex life and excellent resistance to mineral oils, sunlight, and oxidation in air. White products or products having pastel shades can be made.

The semi-annual index to "New Products and Processes" appears on page 1018.

Waxy Plasticizers

Phlobaphenes, catechol esters of different saturated and non-saturated aliphatic acids, containing 16 to 22 C-atoms, can be used as softening agents in the plastics industry.

On account of their behavior in solvents, and because of their melting points, viscosity and physical properties, they are very suitable to replace, in many cases, not only plasticizers derived from castor oil and alkyd products, but also the phthalic acid derivatives.

Phlobaphenes can be manufactured on a large scale from bark. They combine with formaldehyde to give phenol-alcohols. These materials were described in *British Plastics*, September, 1947.

Proteins, Pigments, From Alfalfa

A new method of processing fresh cut green alfalfa promises to open industrial outlets for such alfalfa products as proteins and pigments. Developed at the Western Regional Research Laboratory, the new process seems to assure savings in freight to distant markets for the processed alfalfa concentrates which are of high value as feeds, particularly for poultry. The possibilities of the alfalfa products in human nutrition and as nutrients for production of antibiotics are to be investigated.

The new process goes a long way beyond the familiar process of dehydration of alfalfa into alfalfa meal, in which the saving of freight charges results mainly from removal of water. The new process concentrates the most valuable parts of

(*Turn to page 1046*)

4 BAKER CHEMICALS For Agricultural Use

DDT

Dichloro-diphenyl-trichloroethane

For household and agricultural pest sprays. Fine granular product approaching a white color, with minimum setting point of 89° C. Uniform in color, makes a clear solution, and free flowing and uniform in particle size. Available in 25, 50, 100 and 200-lb. containers.

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Formulations

For lawn and agricultural weed killers. Baker's 2,4-D formulated dry powders and liquid concentrates are ready for packaging by the distributor. Produced in types readily diluted by the user for specific herbicidal purposes. 2,4-D acid and sodium salt available also in bulk containers for processors.

CS_2

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New insecticide, ovicide, and larvicide for controlling livestock pests—horn flies, stable flies and bot flies—cotton insects such as boll weevil, cotton aphis, cotton fleahoppers, and fruit and vegetable aphis. Available in bulk containers.

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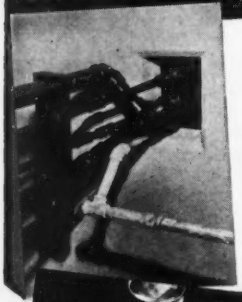
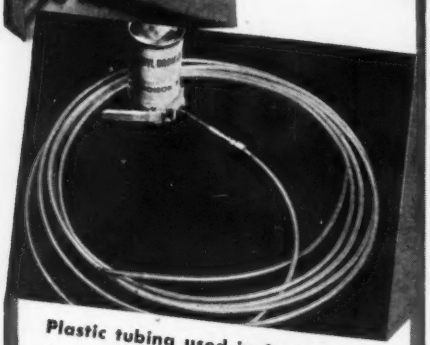


Typical installation of plastic pipe in a chemical plant, with other pipe alongside.



Plastic tubing used in fumigating boxcars.

●

With the right type of plastic and within the range of applications for which it is fitted, plastic pipe and tubing often possess distinct advantages over other kinds.

Thousands of chemical plants have proved this in installations which have stood up for years under conditions which no other type of pipe or tubing could endure.

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New Products and Processes Index
Volume 61, July-December, 1947

Acrylic elastomer 1014
Adenosine triphosphate 648
Adhesive, Synthetic 654
  Water-resistant label 250
Adsorption clay 72
Albumin, Bovine plasma 648
Alcohol process, Grain 250
Alfalfa, Proteins and pigments from .. 1016
Alkyld resin 440
Alkyl aryl sulfonate 1006
Aluminum, Color anodizing of 78
  corrosion preventive 1012
Allyl starch 830
Anodizing of aluminum, Color 78
Anti-oxidant, Fat and oil 242

Benzonitrile 438
Biochemicals, Commercial-scale 648
Buffing compounds, Metal 836

Carboxymethylcellulose, Sodium 1010
Carvacrol 1006
Catechol esters 1016
Cationic surface-active agents 830
Cellulose acetate propionate 244
Chlorcarvacrol 1006
Chlordan, Solubilizer for 1006
Chymotrypsin 648
Clay, Adsorption 72
  Colloidal 442
Coating, Fast-drying 1012
  for aluminum 1012
  for concrete 650
  Metal 438
  Protective 1012
  resin 242
  service 250
  Temporary protective 1006
Color anodizing of aluminum 78
Concrete, Coating for 650
  sealer 1014

2,4-D solubilizer 440
Demulsification of water gas tar emulsions 248
Deuterium oxide 82
Dimethylaminomethyl phenols 70
Disinfectants 644, 1006
2,5-Ditertiary butyl hydroquinone 642
Dye aids, Black 1006

Electroless plating 274
Electropolishing solution 440
Emulsions, Demulsification of water gas tar 248

Fat and oil anti-oxidant 242
Fibrinogen, Bovine 648
Flameproofer for textiles 644
Floor tile, Vinyl 70
Fluxes, Metal 650
Food canning process 1010
Food processing, Radar for 1010

Glass, Acid-resistant 840
  Ink for 444
  Photosensitive 80
Grain alcohol process 250
Grease process, Continuous 646

Hydroquinone monomethyl ether 642

Ink for glass 444
Ion-exchange resin 70
Isopropyl alcohol 1012

Lubricant, Metal 648
Lysozyme 648

2-Mercapto-4,6,6-trimethyl thiazine ... 438
Metal coating 438
  buffing compounds 836
  fluxes 650
  lubricant 648
Methyl glyoxal 72
Methylmagnesium iodide 244
2-Methyl-1,3-pentanediol 438
Methylphloroglucinol 1006

Neoprene paint 650
2-Nitrothiophene 1008

Oil sludge, Test for 242

Paint, Neoprene 650
  pigment 838
Papermaker's felts, Resin improves ... 246
Patent finish plastic material 76
Pepsin 648
Peracetic acid 642
Phenols, Dimethylaminomethyl 70
Phlobaphenes 1016
Phloroglucinol 1006
Photosensitive glass 80
Pigment, Paint 838
Pigments from alfalfa 1016
Pipes, Wetting agents protect 254
Plasticizer for polyvinyl chloride 252
  for rubber molding, Bulky 78
  Polybutene 244
  Polyester 438
  Rubber 242
  Vinyl 76
  Waxy 1016
Plastic material, Patent finish 76
Plating, Electroless 274
  processes 836
Plexiglas, Patterned 248
Polybutene plasticizers 244
Polydiaryl amines 1008
Polyester plasticizer 438
Polyethylene flat tubing 252
Polyisobutylene concentrates 1008
Polymer, Water-soluble 832
Polyoxyethylene fatty esters 1006
Polystyrene, Surface finishes for 72
  Surface treatment for 642
Polyvinyl chloride-nitrile rubber blends 74
Polyvinyl chloride, Plasticizers for ... 252
β-Propiolactone 834
Proteins from alfalfa 1016
Pyruvic aldehyde 72

Quaternary ammonium disinfectant .. 644

Radar for food processing 1010
Resin, Alkyd 440
  Coating 242
  improves papermaker's felts 246
  Ion-exchange 70
Ribonuclease 648
Rubber, Acrylic 1014
  blending, Styrene plastic for 246
  bloom inhibitor 652
  molding, Bulky plasticizers for 78
  Non-staining 1014
  plasticizer 242
  Silicone oil strengthens 74

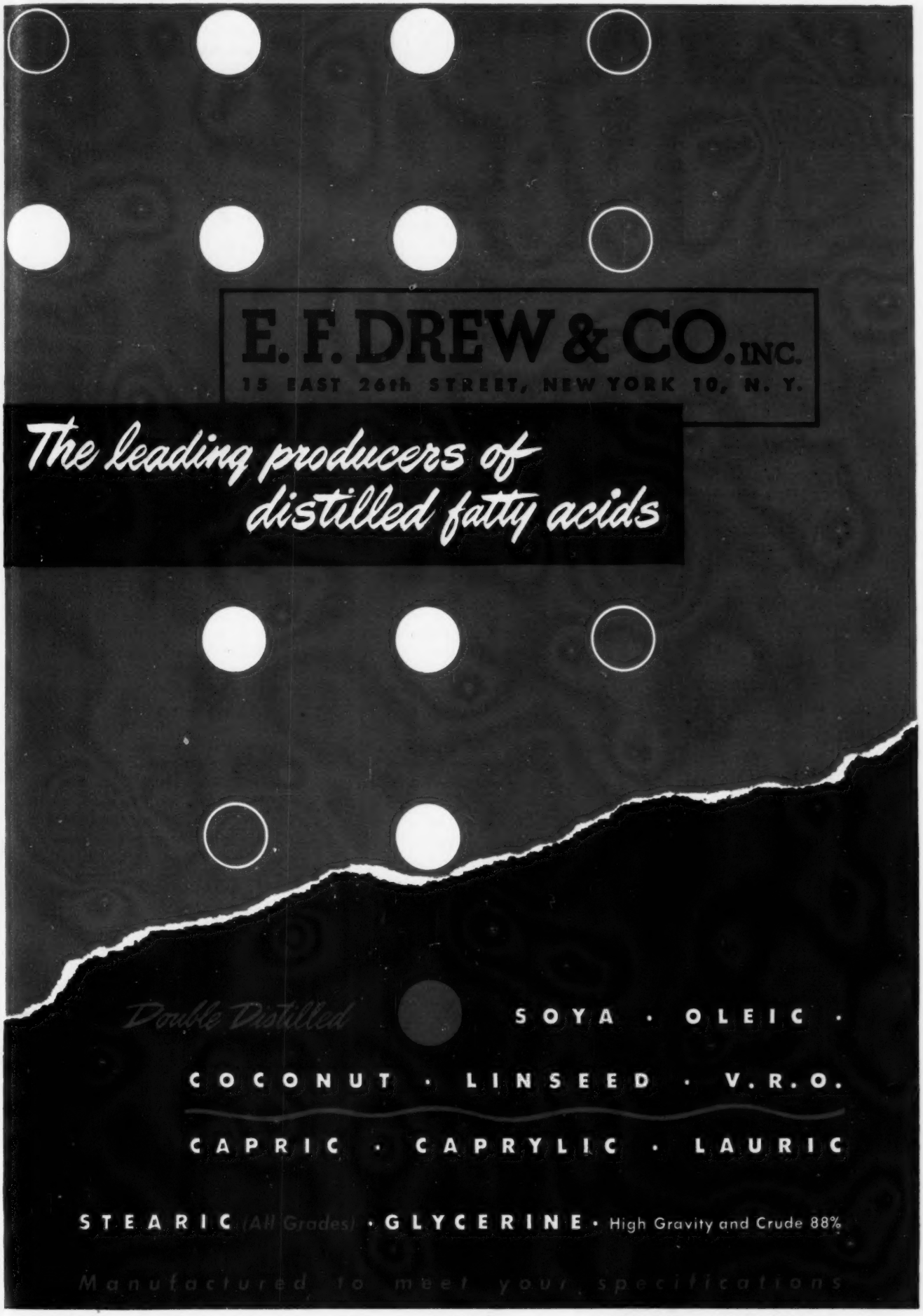
Sealer, Concrete 1014
Sealing tape 652
Silica, Colloidal 830
  Extra-fine 1006
Silicone oil strengthens rubber 74
Silver nitrate process 834
Sodium carboxymethylcellulose 1010
Sodium chlorite protects sugar 254
Soybean nutrient for streptomycin 832
Starch, Allyl 830
Streptomycin, Soybean nutrient for .. 832
Styrene plastic for rubber blending ... 246
Sugar, Sodium chlorite protects 254
Surface-active agents 1006
  Cationic 830

Textiles, Flameproofer for 644
Triaminotoluene 1006
Trypsin 648

Vinyl ether process 840
  floor tile 70
  plasticizer 76

Wax improvers 1008
Waxes, Emulsifiable 438
  Synthetic 242
Waxy plasticizers 1016
Wetting agents protect pipes 254

Zerewitinoff reagent 244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NEW EQUIPMENT

Center Control Fork Truck QB 381

The Baker Industrial Truck Division of The Baker-Rauling Company announces the Type FQH-10 center-control fork truck which is designed to meet the need for a small, light-weight and low-

priced fork truck of 1000 pounds capacity. After four years' development a pilot truck of the production model has been built and tested and quantity production has been started for delivery in March, 1948.

This truck has a 36" wheelbase and an overall length, exclusive of forks, of 53⅜". To make a right angle turn the truck requires only 67½" plus the length of the load, and since the truck is designed for a 1000-pound load 30" long, a right angle turn can be made in 97½". The truck is only 28" wide. Its light weight—only 3800 pounds with load—permits its use on floors having limited capacity, on low capacity elevators and in highway truck loading.

Centrifugal Pump QB 382

A new centrifugal pump, utilizing the Sherzer hydraulic principle, is now in production by the Mission Mfg. Co.

The new pump, with a concentric casing, is said to reduce turbulence and cavitation found in volute-cased pumps. Only four easily removable parts—casing, impeller, wear plate, and shaft—are in contact with the fluid pumped, and these are furnished in any workable alloy.

It is a single-stage, end suction type, with non-clogging fluid passages which permit handling of slurries containing materials in suspension or solids.

Changes in capacity and head requirements within a wide range can be accomplished by the simple change of impeller diameter or of casing and impeller size.

Small Size Temperature Recorder QB 383

A miniature-size temperature recorder, for use where a shock-resistant, easily portable temperature recording instrument is necessary, is now available from the C. J. Tagliabue Mfg. Co. Because of its small size and portability, it is extremely useful for checking refrigerating, heating and air-conditioning equipment.

The instrument is available in two forms: the single-pen recording thermometer for recording temparature only, and the two-pen temperature and time-operation recorder, which charts the running time in addition to recording temperature. The pen-arm is "jiggle-proof", and thus temperature record is unaffected by vibration. The instrument is available in model to operate in a wide variety of ranges, and chart drive is a 7-day spring-propelled mechanism with charts of 24 or 72-hour duration. Overall dimensions are: 5¾" square, 4¼" deep, and the total weight is less than 3½ lbs.

Variable Speed Motor QB 384

Designed to maintain constant maximum torque at all speeds, the new Guernet Model variable speed motor of Guernet Electrical Machinery, Inc., is variable from 1500 to 6000 RPM, giving adjustable, step-less speed control. A lever at the side of the motor stops and starts the motor and mechanically controls a pair of centrifugal vibrating contacts which accomplish the speed variation. The lever easily lends itself to mechanical coupling.

The motor is ⅛ H.P., ball bearing, universal wound, reversible, 115 volts, single phase, any frequency, and is approximately 9" by 7" by 5". It is available also with single and double reduction gears and flexible shafts.

Tube Fitting QB 385

A new type tube fitting employing a hardened alloy spring steel sleeve is available from the Flodar Corp. The fitting consists of three parts; a connector body, a tightening nut, and the contractible sleeve which grips the tube with slotted, spring steel fingers when the tightening nut is turned.

Flodar grip tube fittings are manufactured in sizes, ¼" to 1½", and are available in straight, union, elbow, side tee, tube tee, and cross, both male and female.

Air-Fuel Ratio Controller QB 386

Complete Leeds and Northrup temperature and combustion control systems now include a new air-fuel ratio controller which has the features of simplicity, accuracy and sensitivity. The controller employs electric-motored valve drives—needs no hydraulic piping.

It is a rugged, balance-type instrument and the ratio can easily be adjusted manually for operation with fuels of various BTU contents. As fuel flow changes, the instrument maintains air-fuel ratio constant at the desired control point, or it can provide automatic variation of ratio, increasing or decreasing the per cent of air at reduced fuel flows.

Dust Collector QB 387

Pulverizing Machinery Co., is invading the dust collection field. According to its manufacturers, the Mikro-Collector's unique contribution lies in the first commercially successful application of hard-pressed wool felt as a filter medium in industrial air and gas filtration. Felt had long been recognized for its potentialities in this respect, because of its durability and its minute pores capable of retaining the finest particles. But its very virtues nullified each other. Its pores were so small in relation to its thickness that they clogged up. In the Mikro-Collector this problem has been solved by the use of a hollow, annular blow ring which hugs and flexes the cylindrical felt bag while moving up and down its outer surface by means of conventional chain and sprocket drive.

Around the inner periphery of the blow

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. 12-7

Please send me more detailed information on the following new equipment:

QB 381	QB 385	QB 389	QB 393	QB 397	QB 402
QB 382	QB 386	QB 390	QB 394	QB 398	QB 403
QB 383	QB 387	QB 391	QB 395	QB 399	QB 404
QB 384	QB 388	QB 392	QB 396	QB 400	QB 405
				QB 401	QB 406
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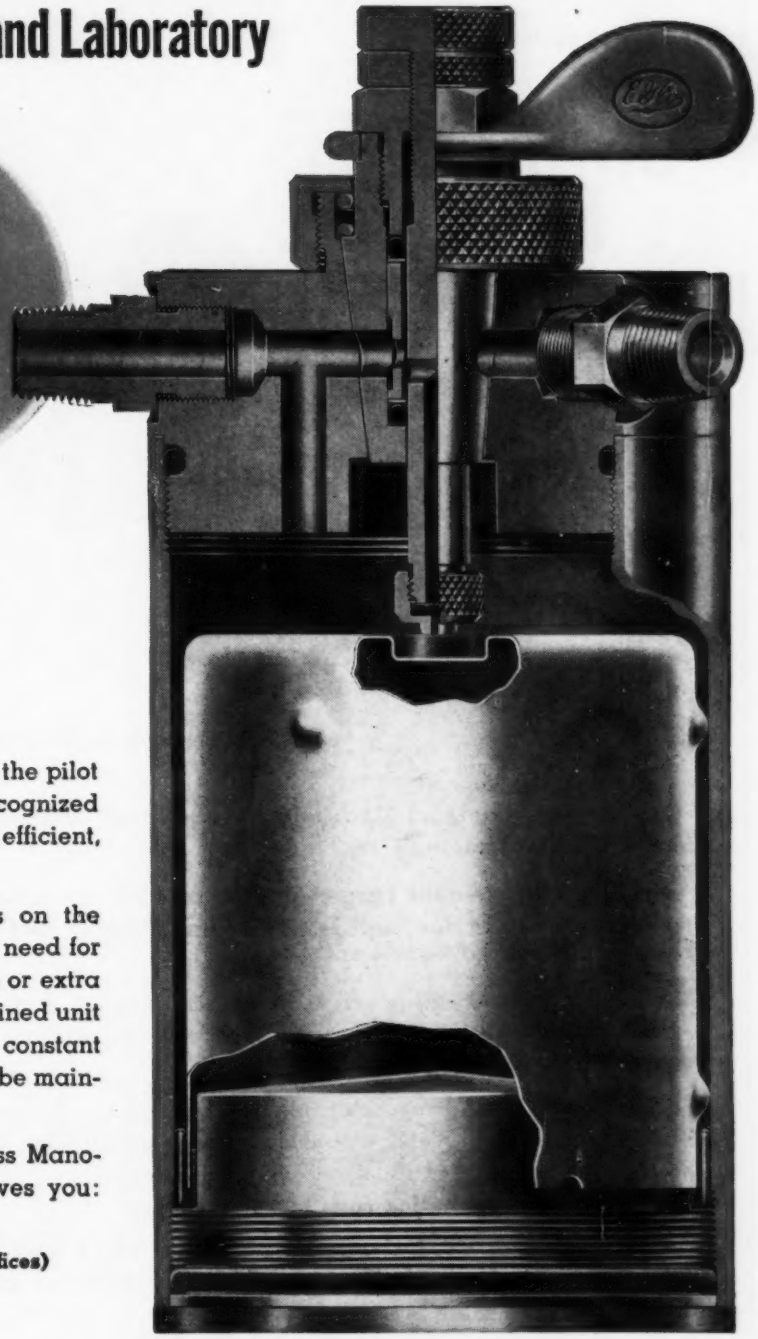
Automatic
Vacuum and Pressure Control
for Industry, Pilot Plant and Laboratory

Based on a Principle Never Before Used in Industry!



- **So simple anyone can operate it!**
- **Just set it and forget it!**
- **Slashes operating costs!**

TESTED in the laboratory and successful in the pilot plant, our new Cartesian Manostat is recognized by industry as *the* answer to the problem of efficient, effortless and economical pressure control.

Completely automatic, this Manostat works on the physical principle of the Cartesian Diver. No need for complicated electrical or mechanical systems or extra equipment of any kind. Just put this self-contained unit in your system—SET IT AND FORGET IT. A constant pressure or vacuum to within 1/10 to 1% can be maintained with this heavy duty, all metal unit.

Incorporating all the advantages of our Glass Manostat, this revolutionary Model No. 5 also gives you:

1—Larger Capacity
2—Wider Range (supplied with 3 interchangeable orifices)
3—Higher Sensitivity
4—Greater Flexibility
5—Control of both Pressure and Vacuum
6—Simplified Operation
7—Fool-Proof Design
8—Stainless and Chrome Steel
9—Low Price

For complete information, including performance and operating data, write for Bulletin ICM-96.

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MODEL No. 5 (INDUSTRIAL)
PATENT PENDING

Complete with 3 interchangeable orifices and mercury, $95.00.
Size: 7½" overall. Diameter: 3¼". Weight: approximately 8 lbs.

The EMIL GREINER Co.
161 SIXTH AVENUE NEW YORK 13, N. Y.

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CHARLOTTE
COLLOID MILL

MODEL N.D. 1 OPEN FOR INSPECTION

A Sturdy, Compact Machine for Laboratory and Small Commercial Operation.

Patterned After the Larger Models, It Is Precision Built for Constant Operation, and Is Sturdy and Rugged in Construction. Readily Cleaned and Sterilized.

The Charlotte Colloid Mill is well known in the *Chemical, Pharmaceutical, Cosmetic, Food* and other fields, where it is daily proving its value to these and other industries.

Wherein *Emulsion, Homogenization, Disintegration* or *Thorough Blending* are necessary and desirable, there is no machine that can accomplish more, and still give *continuous production* with consequent saving in production costs and floor space.

For a Thoroughly Blended, Homogeneous Product, with a finer texture, use the CHARLOTTE. We know that you will be well satisfied with its performance as have so many others.

The Charlotte Colloid Mill is manufactured in sizes ranging from 1 h.p. to 75 h.p.

Send for descriptive catalog.

CHEMICOLLOID LABORATORIES, Inc.
44 WHITEHALL STREET
NEW YORK 4, NEW YORK

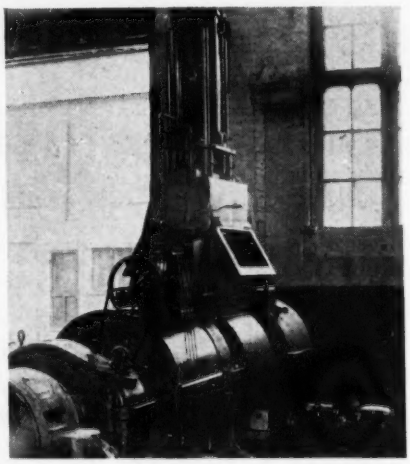
ring is a narrow slit through which is directed a jet of air supplied by a positive pressure blower. This counter-current of air is conveyed to the blow ring by a flexible hose and assures a perpetually clean bag. It also means that during the filtering operations no portion of the filter surface need be cut off for cleaning or shaking.

99.99 per cent minimum recovery of most solids is claimed. Actual operation records from a number of installations reveal the following filter rates: minimum, 8 cubic feet per square foot of filter surface per minute; average, 20 cubic feet; maximum, over 30 cubic feet.

Another important claim made for the Mikro-Collector, is the ability to handle dusts containing a high percentage of moisture or oil.

Mixer QB 388

The Northmaster intensive mixer, designed for mixing all types of heavy and tenacious materials, has been developed



by Struthers Wells Corp. It is available in working capacities of from 1 pint to 275 gallons. Northmaster intensive mixers can be used for processing natural and synthetic rubber, asphalt compositions, reclaimed rubber, linoleum, floor tile compositions, paints, and many other hard-to-handle materials.

The intensive mixer is equipped with heating or cooling jackets for ram, trough and blades. The machine incorporates anti-friction bearings with integral gear unit attached to the trough and rotating with it. New metal-to-metal seals guard against leakage. The mixing chamber is liquid—and dust-tight and rotates through 180° to permit easy dumping and cleaning.

Pneumatic System for Materials Handling QB 389

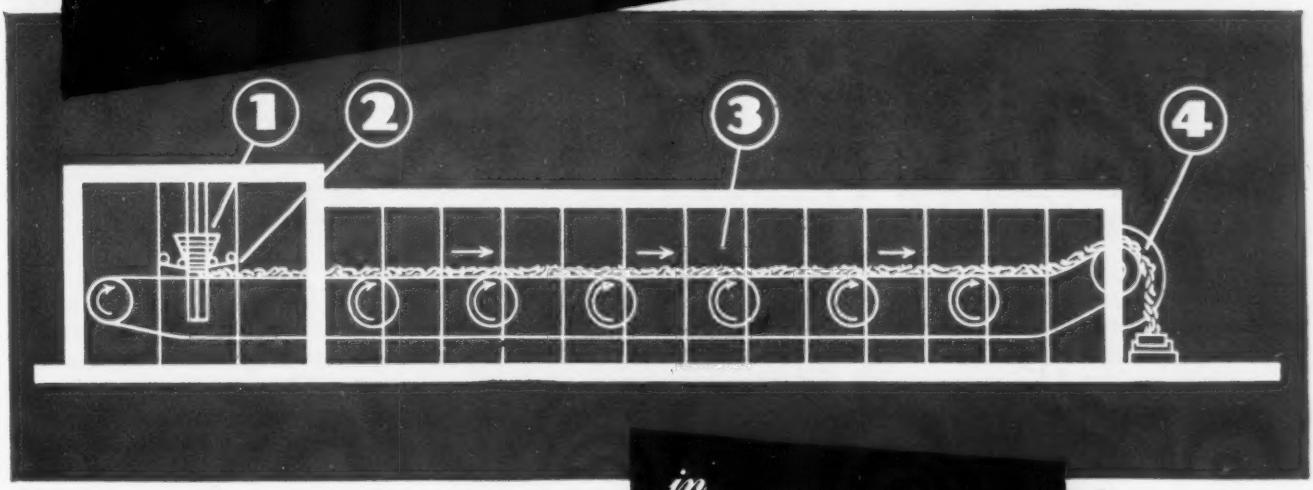
Sprout-Waldron's Pneu-Vac system is reported to reduce product loss through collector exhaust by as much as 10% and eliminate the need for a second filter collector.

Because the entire system is under reduced pressure, injurious or objection-

ZINC OXIDE

REDUCED TO 0.25% (B.D.W.B.*) MOISTURE CONTENT AT RATE OF 1,830 POUNDS PER HOUR

*BONE DRY WEIGHT BASIS



in PROCTOR *Continuous Conveyor System*

Tonnage production of thoroughly, uniformly dried zinc oxide was converted from a production dream into a reality with the installation of a Proctor continuous conveyor drying system, combined with a preforming feed.

Here is how the Proctor system operates in the handling of zinc oxide. ❶ Having been mechanically dewatered by means of a continuous filter, the still highly moist zinc oxide is deposited into the hopper of a Proctor rolling extruder feed. ❷ In this rolling extruder feed, the material is forced through a perforated plate by rolls moving back and forth and deposited in spaghetti-like extrusions onto the conveyor of the dryer. This particular type of preforming feed is used because the physical characteristics of the zinc oxide are such as to permit it holding a definite shape after extrusion. ❸ Entering the dryer, with a moisture content of 69.5% (B.D.W.B.), these extrusions of zinc oxide lie in a bed on the perforated plate continuous conveyor of the dryer. The shape of the uniformly thick extrusions makes it possible for heated air at a temperature of 275°F. to circulate *through* the bed of material—thus promoting rapid diffusion and subsequent speedy, thorough and uniform drying. ❹ After 105 minutes of drying time, the extrusions of zinc oxide are discharged with a moisture content of 0.25% (B.D.W.B.)—uniformly dried at the rate of 1,830 pounds per hour (C.D.W.).

This installation represents one more instance where Proctor engineers converted facts gathered in the laboratory and translated those facts into a drying system that is meeting a specific need in the chemical process industries. Each Proctor system is individually designed to meet individual product and plant requirements. If drying is a part of your plant operation, you may be pleasantly surprised at what an individually designed Proctor drying system can do for your production. Consult Proctor engineers without obligation.

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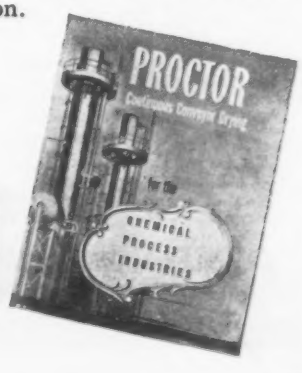
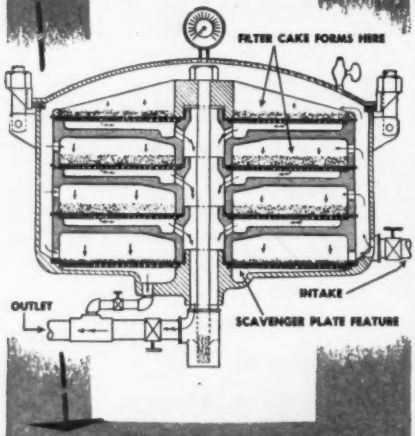
A new 12-page booklet on "Proctor Continuous Drying for the Chemical Process Industries" is available upon request. It contains many case studies showing the application for Proctor individually designed systems. Write for your copy of this informative booklet today



the horizontal plate principle



. . . makes these the "filters that filter all liquids"—

SPARKLER
Horizontal Plate
FILTERS

. . . and here's the story:

- Sparkler Horizontal Plate Filters handle any liquid from heavy varnishes to light alcohols, including products such as acids, oils, beverages, milk, pharmaceuticals, plating solutions, water, etc.
- Equally efficient performance on intermittent or continuous operation, under a wide range of temperature, pressure and viscosity conditions.
- Equally effective whether removing carbons and contact clays or clarifying and polishing with filter aids.
- Patented Scavenger Plate permits complete batch filtration. (It's virtually an auxiliary filter with an independent control valve.)
- Unexcelled filter cake stability—no slipping or breaking.

. . . why?

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always *with* gravity.
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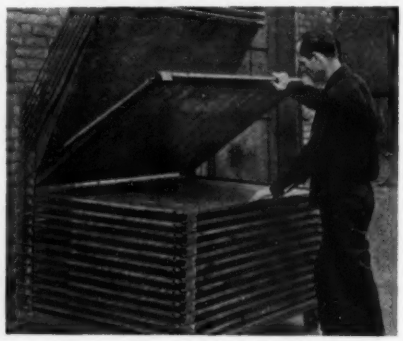
SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS

able dusts cannot escape through piping connections.

Material does not pass through the pneumatic fan located on top of collector, thus there are no parts to wear out—a considerable saving, especially important in the handling of abrasive materials.

Book Truck For Dryer QB 390

A new book truck which can be used for curing rubber and in the production of plastics or other products where the rapid drying or curing of sheets or parts is essential, is available from the Palmer-



Shile Co. It is constructed of a heavy gauge steel with welded all steel shelves, reinforced to withstand rough usage and provide additional rigidity and assure longer life. Long, sturdy extension springs permit easy raising and lowering of individual shelves. When raised, shelves are automatically held up in tilted position to permit operator complete accessibility from any position.

Equipped with metal or rubber tired wheels or casters, and can be built with legs or with skids to accommodate power lift or hand-operated trucks. The strength of shelves in accordance with individual weight requirements. Manufactured in all sizes to meet exacting production requirements.

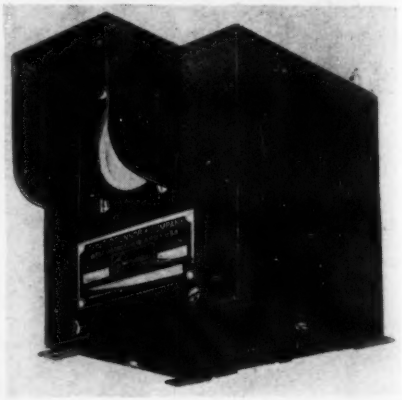
Meter-Equipped Hand Pump QB 391

The new, meter-equipped, rotary hand pump is built for fueling or dispensing of liquids up to 10,000 saybolt second units viscosity. The meter registers to 8 gallons and is equipped with a 9,999 gallon totalizer. The unit includes a 40" suction pipe with bung attachment, 8' oil resistant discharge hose and aluminum nozzle.

Pump features include an aluminum rotor, graphite-carbon vanes, cadmium plated packing nut and stainless steel springs.

Photoelectric Detector QB 392

The new, low-cost Electronic handyman, photoelectric switch, developed by John T. O'Connor & Co. is of universal design and plugs into any convenient outlet. It accepts the "item to be controlled" plug at either of its normally on or normally off receptacles.



A unique "combination" layout and special circuits, working on internally converted direct current, provides much faster switching operations for high-speed counting, limiting travel, etc. The device will measure light intensity as well as acting as a switch. Also, there is provision in the housing for making it a combination counter or meter. Moreover, the internal arrangement provides for filters for color or infra-red (invisible) operation. An unusually fine and large light gathering lens (2" dia.) together with a very directional internal optical arrangement (selective only to light received from a 5° arc) makes possible various gauging, measuring and controlling applications all in one unit and without the use of any sensitivity adjustment.

Dew Point Recorder QB 393

Dew point recorders are the newest industrial instruments offered by The Foxboro Co. The unique feature of the equipment is Foxboro's patented measuring element, the Dewcel. It has the general appearance of a perforated metal cylinder about 9" long and 2" in diameter. Within is a central tube containing the thermal bulb, wrapped with a saline-saturated woven glass tape and two windings of silver wire, to conduct the heating current. Moisture determination by the Dewcel is based on the fact that for every water vapor pressure in contact with a saturated salt solution there is an equilibrium temperature at which the solution neither absorbs nor gives up moisture to the atmosphere. The function of the variable heat supply is to bring the Dewcel to this equilibrium temperature. This temperature, measured by the thermal bulb, is transmitted to the recording instrument, and is read on the chart in degrees of dew point temperature. Recording is continuous.

Various standard chart ranges are available.

Important FACTS ABOUT pH for PROFIT-MINDED EXECUTIVES

WHETHER YOU ARE an executive responsible for planning long-range plant production, or for obtaining maximum efficiency from present processing operations, one of the most important advancements you can make is the installation of *Beckman pH Control.* Through the proper application of modern pH control you can make *many* vital savings . . . savings that will quickly pay for the installation and will *continue* paying big dividends throughout the years. For example, some of the many benefits resulting from Beckman pH Control include . . .

. . . saving valuable chemicals through more accurate control of dosages.
. . . reducing costly corrosion by pre-regulating acid and alkaline solutions.
. . . speeding up process operations by operating at optimum pH values.
. . . minimizing rejects by increasing the uniformity of process solutions.
. . . and many other important savings in time, materials and plant operating costs.

BUT TO MAKE CERTAIN you get the latest, most convenient and most accurate pH equipment available, *be sure to specify* "BECKMAN"...

Beckman pH equipment is completely electrometric, eliminating the mess and inaccuracies of colorimetric methods. Simply press a button and the exact pH of any process is instantly shown on a large easily-read dial. *It is the simplest of all pH methods!*

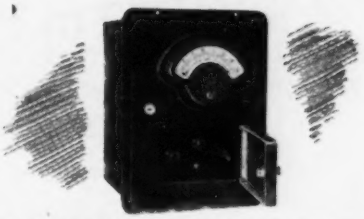
The accuracy of Beckman pH readings is completely unaffected by human errors in color judgment, by turbidity, oxidizing or reducing agents, by suspended materials, colored process solutions or other variables that affect outmoded colorimetric methods. *Beckman pH readings are universally accurate and dependable!*

With Beckman equipment no time-wasting or troublesome sampling devices are needed. Beckman pH electrodes may be installed directly in vats, tanks, channels or flow lines—and exact pH values read instantly—and continuously, if desired—on the process fluids themselves.

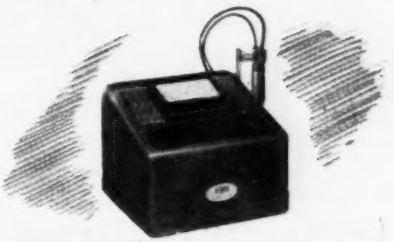
Unique rugged-type Beckman Electrodes, specially designed for direct immersion in abrasive or suspension-laden fluids, reduce maintenance to an absolute minimum. *Beckman is the most trouble-free of all pH equipment!*

The above are only a few of *many* Beckman advantages. Beckman pioneered the modern glass electrode pH instrument . . . pioneered the first completely automatic pH indicator, recorder and controller . . . pioneered High Temperature Glass Electrodes which can be used continuously at temperatures as high as 212° F. (100° C.) . . . pioneered High pH Electrodes which permit accurate measurements of high pH values even in the presence of sodium ions . . . and pioneered many other virtal advancements. In fact, Beckman is the only pH equipment embodying every modern advancement in the fields of pH!

THERE'S A BECKMAN pH INSTRUMENT FOR EVERY NEED



COMPLETELY AUTOMATIC! The Beckman Model R instrument operates directly from standard 110 v. A.C. lines to provide completely automatic pH indication. Also provides for completely automatic pH recording and automatic process control. Can be installed to give accurate pH readings from various stations in plant through one instrument. *This is the pH unit being installed by today's most modern plants, large and small.*



PORTABLE A.C. OPERATION! The Beckman Model H instrument can be quickly moved from one part of the plant to another and plugs directly into standard 110 v. 50/60 cycle A.C. current. Compact, convenient and extremely simple to operate, the Model H gives instant pH readings on an easily-read dial. It is widely used both for manual pH control of small plants and as an auxiliary instrument on completely automatic pH installations.

COMPLETELY SELF-CONTAINED! The Beckman Model M is the ideal pH instrument where *complete* portability is desired. Operating from its own self-contained, long-life power supply, the Model M can be used *anywhere* in the plant or field, whether convenient to power lines or not. Features the same accuracy, simplicity and operating speed as the Model H, and is also widely used both for manual pH control of small plants and as auxiliary equipment on large automatic installations.

Write for literature on Beckman pH Equipment!

BRING YOUR pH PROBLEM TO US. Our trained engineers will gladly study your problem and recommend the equipment best suited to your particular requirements. No obligation, of course.

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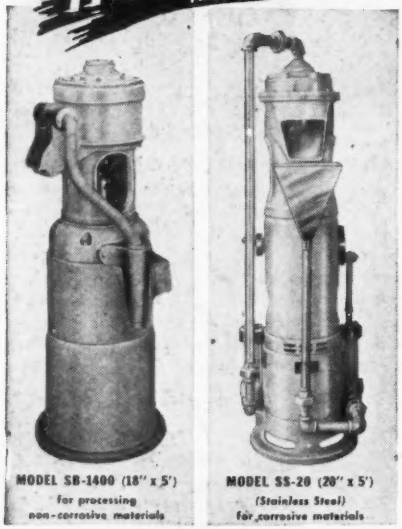
SAVE up to 50% on MILL COSTS with

MOREHOUSE HY-R-SPEED MILLS



MODEL SB-1400 (18" x 5') For processing non-corrosive materials

MODEL SS-20 (20" x 5') (Stainless Steel) For corrosive materials

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Now you can have processing equipment that is amazingly compact, versatile and efficient at half the cost of old style mills. Occupying only a fraction of the space required by ordinary units, these new Morehouse models produce several times as much—better and more efficiently. They are designed for use on a wide range of materials, both wet and dry. Adjustment is quick and easy, either for individual materials or methods of processing including

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The Morehouse high speed principle makes these revolutionary mills possible. Advanced engineering design and nearly half a century of experience in manufacturing quality products contribute to smooth, economical, dependable operation. Save money, save valuable space and improve both volume and quality with Morehouse HY-R-SPEED MILLS. Write for complete details.

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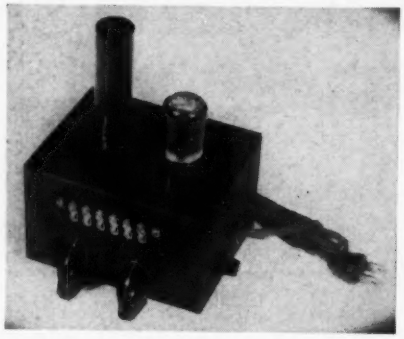
Since 1898

Repeat Cycle Timer QB 394

For process control as well as life testing and laboratory use, the new repeat cycle timer of G. C. Wilson & Co.

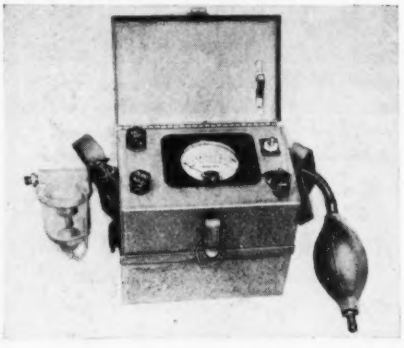


is finding wide application. Independently variable on and off intervals ranging from 0.1 second to 4.0 minutes are available. Complete adjustability is provided and wide variations in line voltage have only a minor effect (less than 1%) on the timing intervals. Means are provided for synchronizing the timer cycle with other equipment.

Relay contacts having up to 2 transfers (double pole, double throw) each rated for 10 amperes at 115 volts AC can be provided.

Combustible Gas Detector QB 395

For the determination of the presence of combustible or explosive concentrations of flammable gases or vapors, the Davis



Emergency Equipment Co. has produced a new supersensitive Vapotester.

One range analyzes combustible gases in terms of their lower explosive limit. A second scale indicates gases in their toxic range.

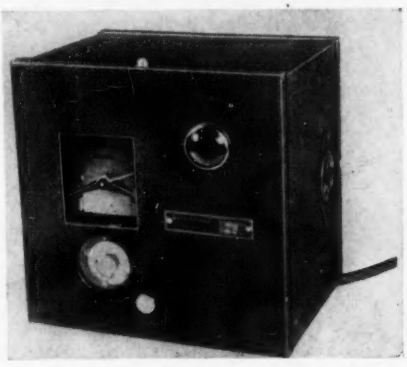
The basic principle of the Vapotester indicator is the measurement of increases in the resistance of a filament when exposed to a gas or vapor-air mixture as compared with a filament not exposed to such gas or vapor-air mixture.

The two filaments, as two legs of a balanced Wheatstone Bridge circuit, are housed in a single cell block having two chambers. The comparison filament is completely sealed in its chamber. The analyzing filament is housed in an open chamber that permits air or gas to be drawn through it.

When the combustible gas-air mixture enters the open chamber, it ignites on the surface of the analyzer filament and increases its temperature. This increases the resistance and unbalances the Wheatstone Bridge circuit so that current flows through the meter. The amount of current flowing through the meter is directly proportioned to the percentage of gas (by volume) present up to the lower explosive limit. Readings are therefore in terms of percentage of the lower explosive limit of the combustible gas-air mixture.

Time Switch QB 396

Developed by Palo-Myers, Inc., a new time switch, known as the Palo Time Switch Sr., is a completely self-contained



unit, incorporating this necessary equipment to turn on or off any type of electrical laboratory apparatus on a predetermined time schedule. It operates at 110 volts, AC.

The clock, of conventional design, is self-starting, with a sweep second hand. A switch dial, geared to the clock mechanism, revolves at the rate of one revolution per day. The dial face bears two adjustable switch fingers—one for off, the other for on—which operate a snap-action switch. This, in turn, operates a relay of the double pole type, capable of breaking 20 amps of non-inductive or heater load. The relay is also rated at 1 HP of motor load.

Vibration Resistant Tubing QB 397

A new flexible tubing made with Inconel innercore and braid is available from Titeflex, Inc. The hose may be supplied for temperatures up to 1700°. The innercore of Titeflex Inconel tubing is supplied with wall thicknesses of 0.005 to 0.015 inches. Construction of the Titeflex tubing is such as to resist failure caused by excessive vibration.

The hose may be supplied with flat ribbon or round wire braid. The flat braid is recommended for higher pressures and resistance to fatigue, especially to sizes of 1" or more. Titeflex Inconel flexible

WHEN LARD COMES OVER THE MOUNTAINS

Here's the inside story—Some of America's most particular people protect every load of lard that travels in a GATX tank car.

Shippers—smart and careful—order a car for lard. They say, "Clean it thoroughly. Rub the walls down with lard before loading to avoid contamination from rust."

Eagle Eyes—*the U.S. inspectors*—look over every inch of the car. Then they write, "O.K. for loading" on the release.

. . . So, thousands and thousands of GATX cars are serviced each year for safe bulk transportation of a perishable food.

. . . This is typical of the work done for the railroads and shippers who use the GATX fleet of more than 37,000 specialized tank cars of 207 types.

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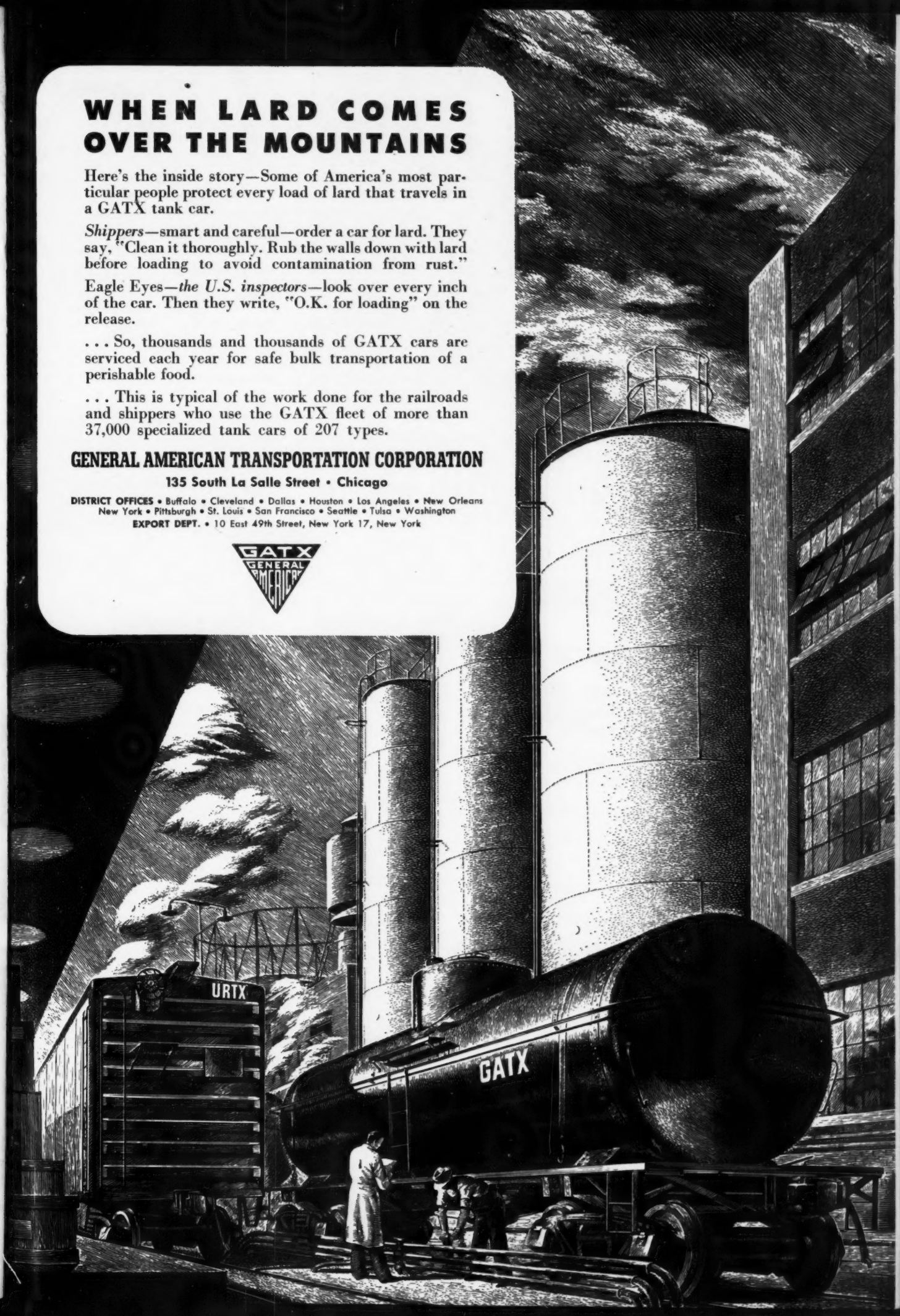

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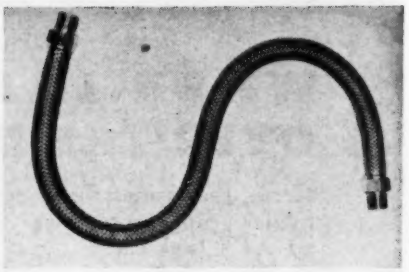
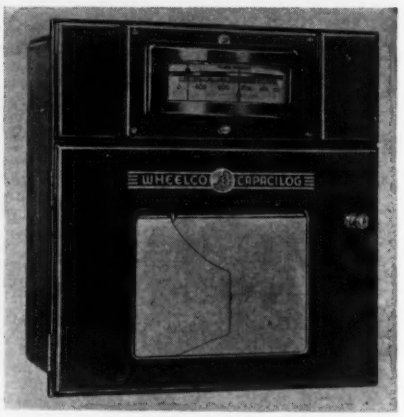


tubing is recommended for extreme service conditions where Monel metal or brass would be affected.

Strip Chart Recorder QB 398

In the new Capacilog of Wheelco Instruments Co., the recording function with a positive power driven pen is

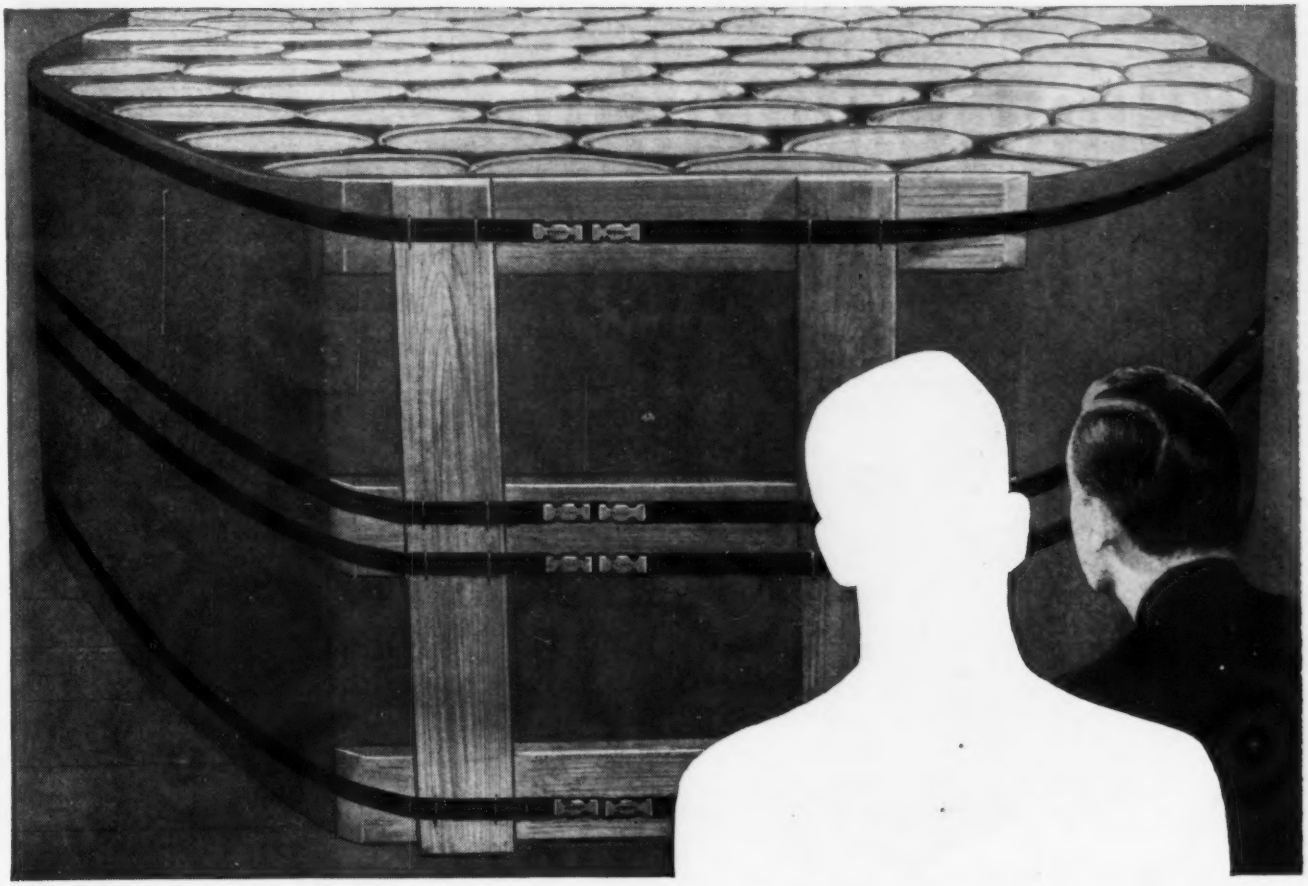


added to the electronic link between measurement and control for deflection and null method types of measuring systems. It operates on 115 or 230 volt, 25, 50 or 60 cycles.

Humidity Sensing Element QB 399

A new and highly reliable humidity sensing element is offered by the American Instrument Co. The operation of this element is based on the ability of a hygroscopic film (assembled in a sturdy housing) to change its electrical resistance instantly with microchanges in moisture content. This element will provide highly accurate measurements over a period of years, and is guaranteed to retain an accuracy within the limits of plus or minus 1½% relative humidity for at least one year. It covers the range of 7% to 100% relative humidity, and its small size (3½ in. in height by 3¼ in. in diameter) makes it suitable for a wide range of applications.

Outstanding features: (1) It responds in less than one second to either decreasing or increasing relative humidities. (2) It detects changes as small as 0.1% relative humidity. (3) When measuring, it neither adds nor removes moisture in significant amounts, even in sealed spaces. (4) Its accuracy is unaffected by changes in barometric pressure. (5) It is ideal for remote installments. (6) It may be



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... and SIGNODE'S SIX-POINT SYSTEM!

The smaller the enterprise, the greater the need for preventing losses in time, money and materials caused by poor packing and shipping methods.

That is why thousands of small businesses among the scores of thousands of Signode customers have asked this man—a Signode packing and shipping engineer—to help them perfect better protection methods.

And his recommendation is *Signode's Six-Point System of Planned Protection!* This time-proved method can stop the profit leaks in your shipping department also. It's worth your while to find out how. Mail the coupon below to start things moving!

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We ship..... In Cartons ☐ Crates ☐ Boxes ☐ Bags ☐ Bales ☐ Bundles ☐ In Carloads ☐ LCL ☐

Name.....

Address.....

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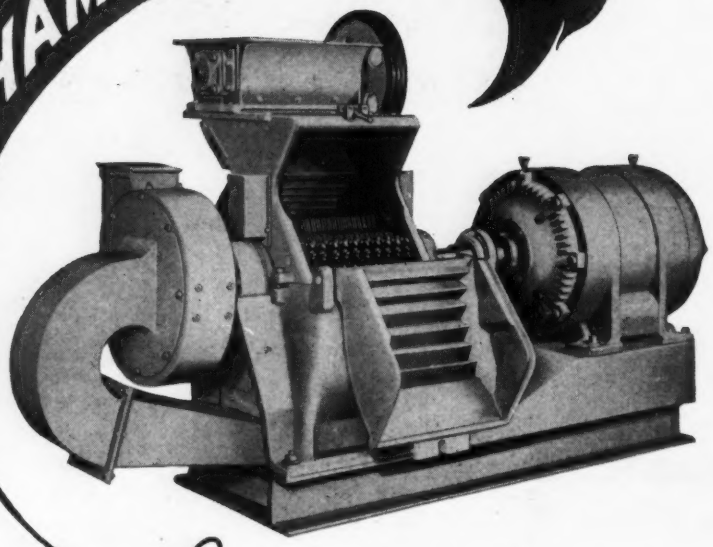
HAMMER MILLS



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★ MAXIMUM CAPACITY PER HORSEPOWER

★ TROUBLE-FREE OPERATION

★ EXCEPTIONAL OPERATING ECONOMY

Ruggedly constructed and uniquely designed, Sprout-Waldron Hammer Mills offer outstanding efficiency on many processing applications. Exceptional operating economy is assured by the mill's overall simplicity.

Every square inch of blasting surface is fully utilized, realizing maximum capacity per horsepower. Sprout-Waldron and Company, Muncy, Pennsylvania.

SPROUT WALDRON
Manufacturing Engineers

MUNCY PENNSYLVANIA

used to indicate, control, and record. (7) It incorporates a temperature measuring element.

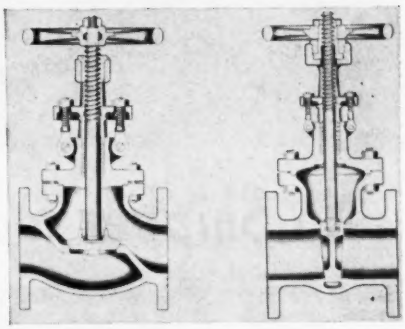
Non-skid Rubber Mat QB 400

The new non-marking, non-skid "Stand-eze" rubber mat is a mat of nearly 2000 small rubber cells, which act to protect legs and feet from standing fatigue. Cells of the "Stand-eze" mat are so constructed that they gather and retain air. Thin rubber strips of the toughest rubber, criss-cross each small cell, producing a "squeegee" action, according to the producer, the Colonial Rubber Co.

It is available in size 16" by 23½", in three color combinations chosen to subdue footprints. The "Stand-eze" mat and in Neoprene oil-and-grease-resistant rubber.

Corrosion-Resistant Valves QB 401

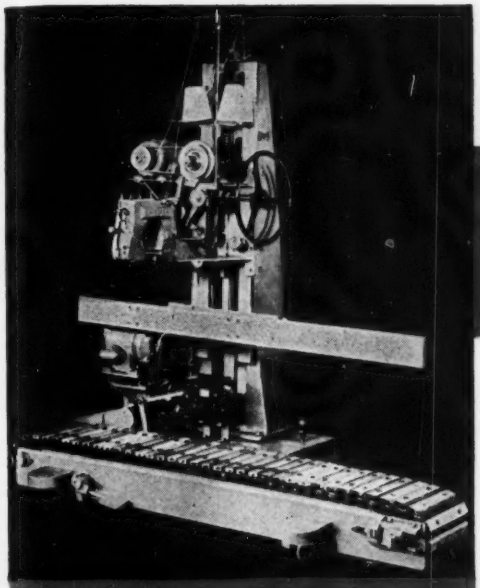
Crane Co. has developed two new lines of corrosion-resistant alloy globe valves and gate valves in sizes 2½", 3", 4" and 6", with flanged ends. Both types of



valves are available in 18-8 Mo and in Monel metal, and are designed for working pressures of 150 psi liquid or gas and working temperatures up to 350 F.

These new valves were especially designed for installations handling chemicals and other corrosive materials. The stem threads are on the outside of the valve, so that they cannot be directly exposed to corrosive action, and the stuffing box is unusually deep, containing from seven to 10 packing rings (depending upon the size of the valve). The yoke-and-bonnet assembly is cast in one piece for greater strength and rigidity, and the bonnet is bolted to the valve body, so that the valve can be easily disassembled for cleaning and servicing. A male-and-female bonnet joint makes it possible to retain the gasket in place without the possibility of blowing out, an important safety advantage in chemical piping. This joint also minimizes leakage and the resultant loss of chemicals.

In the globe valve a new design of body cuts down resistance to flow through the valve to a minimum. The disc in this valve has an accurately machined, ball-shaped seating surface. A narrow-line bearing surface easily breaks through deposits left by certain types of fluids and helps maintain seat tightness.



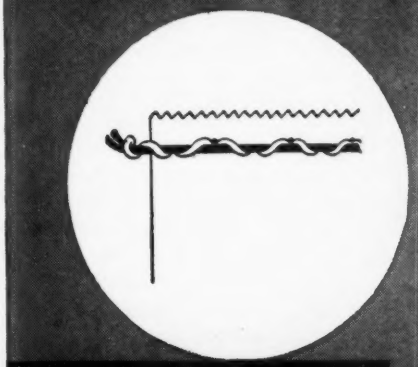
MODEL "E 1" (portable)—one operator can close up to 15 filled bags per minute. A single foot pedal controls both conveyor and sewing head. Handles both paper and textile bags.

Strong, Tough Closures

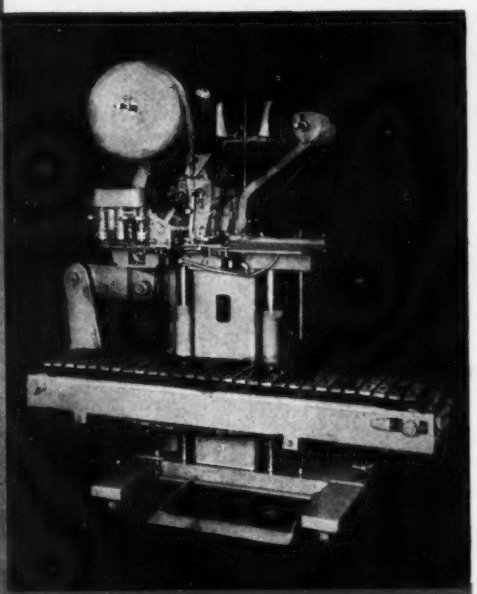
—mass produced!

Mechanize your closing of heavy-duty, multiwall paper bags, with BAGPAKERS.® You swing into production line speed—up to 15 bags per minute. BAGPAKERS apply famous "cushion-stitch" closure that absorbs strains and won't pull out. When sealed with strong BAGPAKER tape, the "cushion-stitch" closure is moisture-resistant, contamination-proof and *sift-proof.*

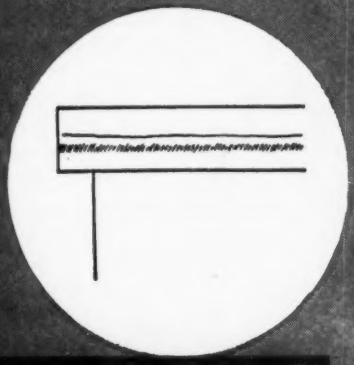
Talk over your closing and handling methods . . . your multiwall paper bag requirements, with a BAGPAK engineer. He knows ways to speed operations and cut costs.



ALL BAGPAKERS MAKE THIS FAMOUS "CUSHION-STITCH"



MODEL "DA" (portable) applies taped "cushion-stitch" closure. One operator, filling and closing, can handle 2 to 4 bags a minute . . . 6 to 12 where filled bags are delivered to BAGPAKER conveyor. Sewing operation starts and stops automatically—no tape wasted.



TAPED CLOSURE IS MOISTURE RESISTANT—SIFT PROOF—TOUGH
Taped closure is effected on Model "DA"

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DEPARTMENT OF THE ARMY

CACTUS ORDNANCE WORKS

DUMAS · TEXAS

Present production capacity, 6000 tons anhydrous ammonia per month. A second ammonia production line, partly constructed, will provide facilities for an additional 6000 tons.

Ideal For Conversion To Production Of Fertilizers

Built by the Government for war time production, this $23,000,000 Chemical Plant, consisting of land, buildings, machinery and equipment is now offered for lease, including warehouses, office, garage, laboratory and service buildings.

Construction varies from permanent (with concrete foundations and floors, asbestos, brick and tile walls and fireproof roofs) to semi-permanent structures. All buildings are in good condition. Conversion to manufacture of fertilizers will require some additional construction.

Rental will be established by competitive bids. Only those bids which include completion of the second ammonia production line will be considered. Most of the materials and equipment for second line available on site.

Arrange for immediate inspection. For information and brochures with "invitation to bid" write to:

Division Engineer
SOUTHWESTERN DIVISION
1114 Commerce Street, Dallas, Texas

LOCATION: 13 miles N of Dumas and 50 miles N of Amarillo, Texas.

TRANSPORTATION: Chicago, Rock Island Gulf RR. Interplant RR system includes 5¾ miles of trackage and classification yard.

UTILITIES: Water from deep wells on site; sewage disposal plant; power and light with 14,060 KVA installed generating capacity; natural gas, compressed air, steam.

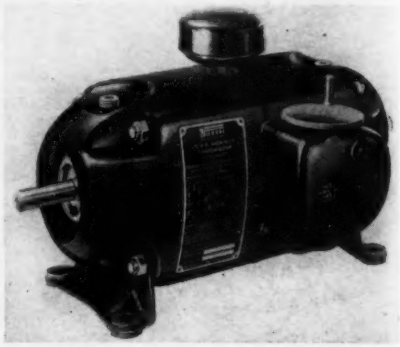
MAJOR UNITS: Synthesis bldg.; low pressure and intermediate pressure bldg.; steam and power plant; change houses. Machinery and equipment include gas reform and nitrogen generation units; degasifying and converter towers; gas reform cooling tower, synthesis, oil recovery, purification and regeneration equipment; and water scrubber; laundry, hospital and cafeteria.

Closing date of bids may be obtained from the Division Engineer.

CORPS OF ENGINEERS U. S. ARMY WASHINGTON, D. C.

Variable Speed Hydraulic Transmission QB 402

Features of the new variable speed hydraulic transmission of Vickers, Inc. includes smooth and stepless speed adjustment from zero to maximum output RPM, in either direction of rotation. Full and constant torque power characteristics are maintained throughout the entire speed range. The input shaft may be driven in either direction without mechanical change. Also, the unit may be stalled without damage as it is equipped with automatic overload protection.



The Vickers TR2-R13F13 transmission is rated at ½ HP, continuous duty. Effortless finger-tip speed adjustment over the complete range, is obtained by either handwheel or servo control.

Hand-Held Electric Tachometer QB 403

A new hand-held electric tachometer which, weighing only 3 lbs., has been developed by the Special Products Division of the General Electric Co. The instrument is designed to give accurate and direct readings of linear speeds from 10 to 10,000 fpm, and of rotational speeds from 100 to 10,000 rpm. Using accessories, rotational speeds from 10 to 100,000 rpm may be measured.

The new tachometer consists of two units—the head, which is placed in contact with the moving object, and the indicating unit to which the head is attached by a flexible electric cable. Speed ranges can be changed while the spindle is rotating because there is no gear transmission to shift for various speed ranges. Accurate speed indications are assured by a low driving torque of only ¼ ounce-inch. The instrument cannot be damaged by overspeeding.

Vibration from the rotating machine does not affect the reading or make the instrument difficult to read. The instrument can measure both clockwise and counter-clockwise rotation.

● QB 404 The new 1948 model Red-E-Haul *Portable Power Pipe Threading Machine* of the American Die and Tool Co., Inc., is designed for installation and maintenance of all piping from ½" to 2" in size. This range can be extended to all

Only POWELL makes a *complete* line of valves for the CHEMICAL & PROCESS INDUSTRIES

POWELL VALVES
for Corrosion Resistance are available in the following Metals and Alloys.

Stainless Alloys
18-8S
18-8S Mo.
18-8S Cb.
Misco "C"
Durimet 20
11.5-13.5% Cr. Iron
18% Cr. Iron
28% Cr. Iron
25% Cr. 12% Ni.

Nickel and Nickel Alloys
Nickel
Monel Metal*
Inconel*
Hastelloy Alloys†
(A, B, C and D)
Illium
D-10

Bronzes—Acid, Aluminum, Silicon
Everdur
Herculoy
Ampco
Ampcoloy
76
90-10
88-10-2

Alloy Steels
Carbon Steel
4-6% Cr. .5% Mo.
3½% Nickel Steel
6-8% Cr. Mo.
8-10% Cr. Mo.

Cast Irons
Cast Iron
3% Nickel Iron
Ni-resist*

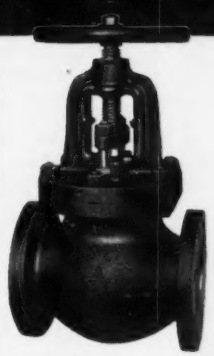
Aluminum
Alcoa No. 43
Alcoa No. B-214

Silver

Hard Lead

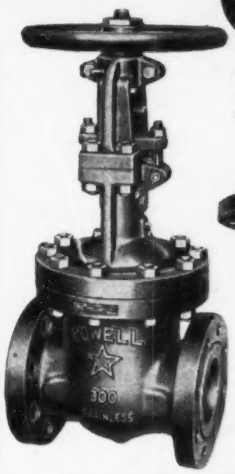
Molybdenum

*Registered trade-names of the International Nickel Co., Inc.
†A registered trade-name of the Haynes-Stellite Co.



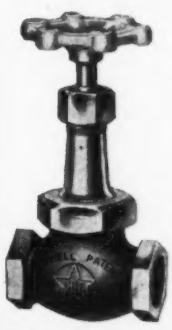
Large 125-pound Iron Body Bronze Mounted or All Iron Globe Valve.

Large 125-pound Iron Body Bronze Mounted or All Iron Gate Valve.



Class 300-pound Stainless Steel O. S. & Y. Gate Valve.

150-pound Ampco Flush Bottom Tank Valve.



200-pound Bronze Globe valve with renewable stainless steel seat and regrindable, renewable "Powellium" nickel-bronze disc.

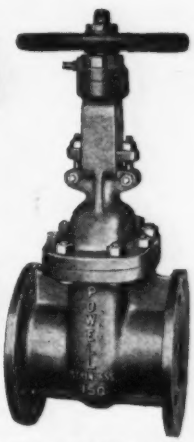
200-pound Nickel Swing Check Valve.

Stainless Steel Needle Globe Valve.

Stainless Steel Glass Sight Feed.

200-pound Bronze Gate Valve with renewable "Powellium" nickel-bronze disc.

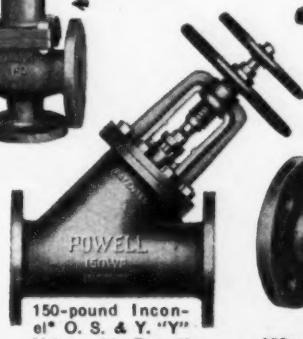
O. S. & Y. Liquid Level Gauge, offset pattern, for 150 pounds W. P.



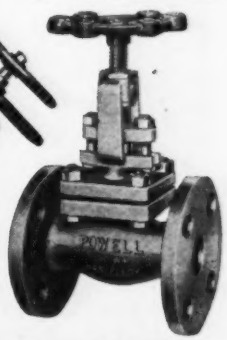
New, standard 150-pound Stainless Steel O. S. & Y. Gate Valve.

200-pound Monel Metal* Gate Valve.

Stainless Steel Angle Relief Valve with enclosed spring.



150-pound Inconel* O. S. & Y. "Y" Valve with Powell Patented Seat Wiper.



150-pound Hastelloy† O. S. & Y. Globe Valve.

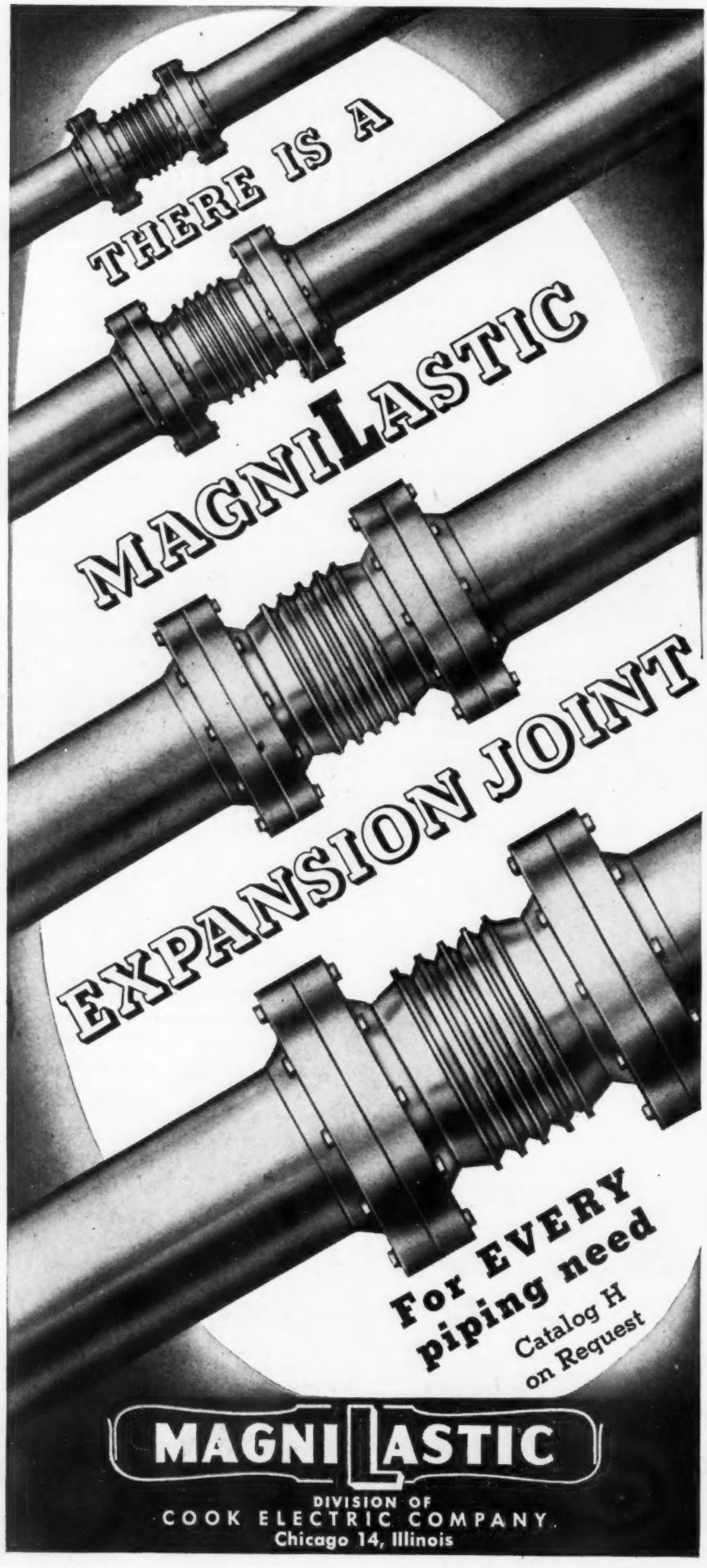
More than a century ago, the Wm. Powell Company adopted a definite, long-range policy, namely, to concentrate on making valves—and valves only—for all branches of industry. As a result Powell has been able, through the years, to meet each new flow control requirement as it has arisen. Thus at any given time in more than a hundred years, the Powell Line has always been *complete*.

As of today, the Powell Line includes Bronze and Iron Valves of all required types, designs and sizes; Cast Steel Valves of all types in pressure classes from 150 to 2500 pounds; and Valves for Corrosion Resistance, available in the widest range of metals and alloys ever used in making valves.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

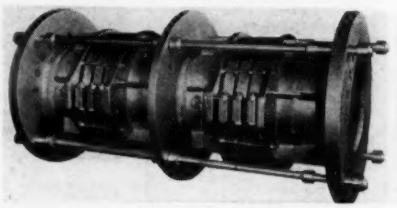
POWELL VALVES



sizes from ⅛" to 12" by use of simple auxiliary equipment.

Red-E-Haul will cut, chamfer, ream and thread any pipe from ½" to 2" without changing dies. The flip of a lever selects the size instantly. Built in safety features for the protection of both operator and machine include chuck, wrench ejector, electrical overload protection and automatic power pump coolant system. An automatic stop opens the dies after standard length pipe threads are cut. However, any length thread may be cut. Several users report cutting continuous pipe and bolt threads up to 10 feet long.

● QB 405 Zallea Bros. & Johnson are now producing a new line of *Universal Expansion Joints,* designed for use in refineries, power plants and chemical process plants. The new expansion joint is



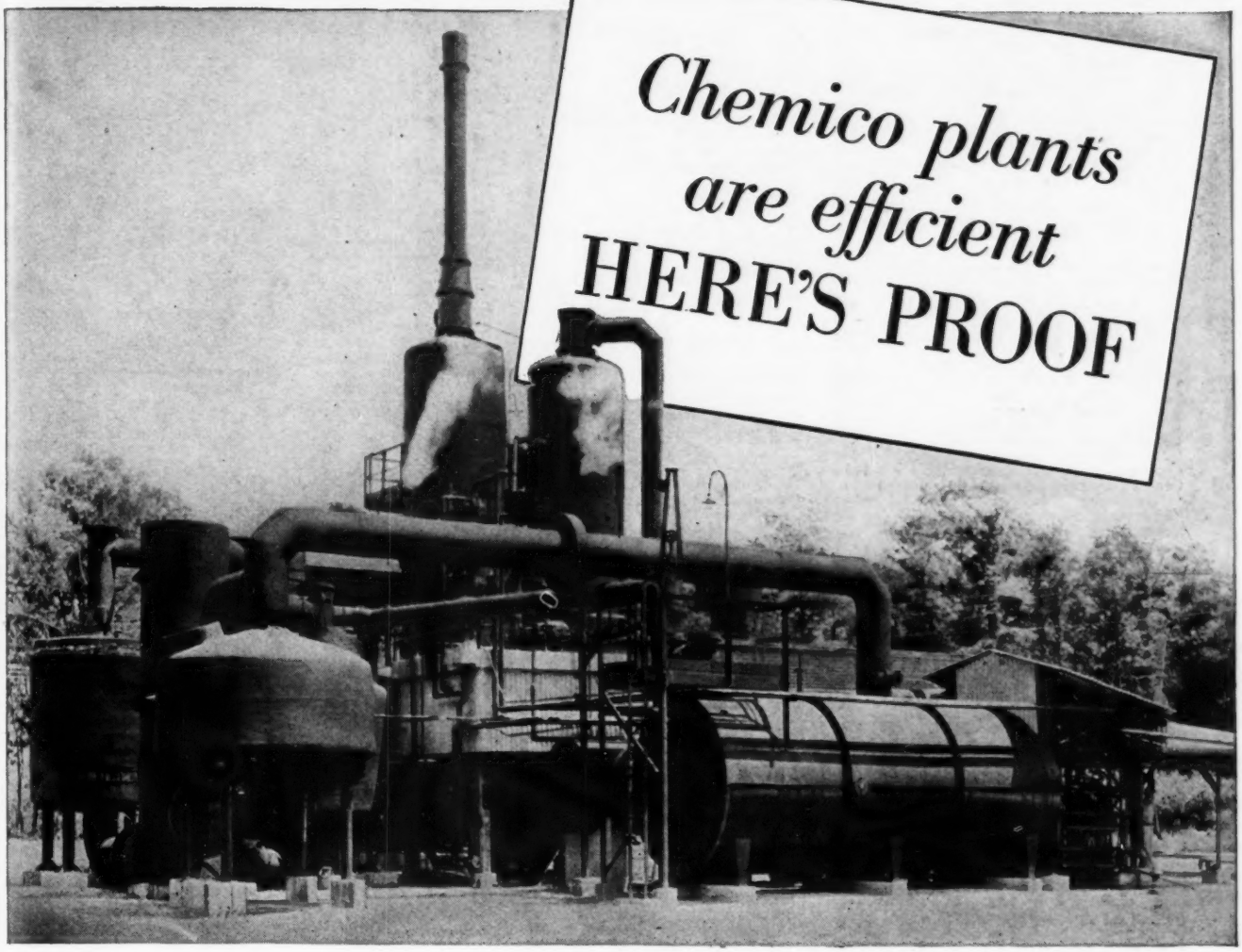
capable of absorbing movement of high temperature lines in any direction—axially, laterally or angularly, or any combination of these.

Essentially, it consists of two corrugated elements linked together by a section of pipe. The amount of lateral movement that can be absorbed depends on the length of pipe between the corrugated elements. The expansion elements can be either of non-equalizing type for pressures up to 30 lbs. or self-equalizing for higher pressures.

● QB 406 The new *Pneumatic Transmitter,* Model 42, of the Foxboro Co. is for use in the pneumatic transmission of industrial process measurements such as flow, static or differential pressure, liquid level, temperature or humidity. It is an indicator-type instrument, available with either an eccentric or concentric scale, both being designed for quick and easy reading.

The most important changer over the previous instrument is a completely new transmitting element, which is exactly duplicated in the receiving instrument. Since the transmitting and receiving mechanisms are exactly matched and perfectly linear in calibration, improved accuracy in transmission is the result. Simplified calibration is another advantage gained in the new design.

● QB 407 As an addition to their regular group of *Micro Ball Bearings,* a newly developed line of extra-small precision grade steel balls, in sizes 1 mm (.0394") and 3/64" (.0469") diameter, is available from New Hampshire Ball Bearings, Inc.



Here's evidence for you . . . black-and-white facts that prove the efficiency of Chemico-built heavy-chemical plants.

Take economy of manpower, for example. A 2-man crew is all you need to operate a 10 or a 300-ton per day capacity contact acid plant *built by Chemico.* This is made possible by centralized control, modern processes and equipment, and simplified plant layout.

Power requirements are negligible. The steam produced by the heat of burning sulfur drives most of the machinery with a substantial excess of steam, from plants of large capacity, which can be used for other purposes and credited against operating costs.

The improved vanadium catalyst assures high conversion efficiency and high overall yield. Such items are guaranteed by Chemico.

Cost-saving efficiency is an integral part of *all* Chemico-built plants . . . in hundreds of heavy chemical installations which Chemico has designed and built in the last three decades.

For your acid plant needs, you can commission Chemico with confidence. Preliminary discussion of your problems and needs involves no obligation.

CHEMICAL CONSTRUCTION CORPORATION

EMPIRE STATE BLDG., 350 FIFTH AVE., NEW YORK 1, N. Y.

European Technical Representative: Cyanamid Products, Ltd.,

Brettenham House, Lancaster Place, London W. C. 2, England Cables: Chemiconst, New York

"Chemico plants are profitable investments"

CC-148

New Equipment Index
Volume LXI, June - December, 1947

Agitator 88
Air Compressor 92
Air Conditioner, Saturating Spray ... 668
Air Dryers, Instrument 664
Air Fuel Ratio Controller 1020
All Metal Pallet with Nesting Ring... 266
Alloy, Welding, Corrosion and Wear Resistant 660
Analyzer, Gas 94
Anti-Acid Pump Lubricant 658
Apron 88
Area Meter for Viscous Liquids 258
Axial Flow Fans 856

Belt Conveyor 90
Horizontal 498
Troughed Steel 90
Blowers 86
Book Truck for Dryer 1024
Bridge Ramp 86

Can Mixer, Change 496
Capacitors, Motor Starting 670
Center Control Fork Truck 1020
Centrifugal Pump 1020
Centrifugal Pumps, Close-Coupled 848
Change Can Mixer 496
Check Valve 94
Check Valves, Swing 494
Clamp for Fork Truck, Drum 846
Close-coupled Centrifugal Pump 848
Coiled Finned Tubing 494
Combustible Gas Detector 1026
Combustion Assemblies, Pre-Engineered Gas 844
Compressor, Air 92
Condensate Return System, High Pressure 494
Continuous Pipeline Strainer 256
Continuous Weigher for Dry Materials 256
Control Valve, Diaphragm 852
Handwheel 260
Controller, Air-Fuel Ratio 1020
Pyrometer 662
Time Cycle 88
Controller and Temperature Indicator, Stepless Input 852
Conveyor, Belt 90
Horizontal Belt 498
Light Weight Portable Gravity 666
Switch 96
Troughed Steel Belt 90
Cooling Tower, Cylindrical 844
Corrosion Resistant Diaphragm Type Valves 660
Corrosion Resistant Pressure Gage... 92
Corrosion Resistant Relief Valve..... 658
Corrosion Resistant Valves 1030
Corrosion and Wear Resistant Welding Alloy 660
Coverings, Neoprene, for Wire Rope Slings 658
Cylindrical Cooling Tower 844

Detector, Combustible Gas 1026
Flammable Vapor 848
Photoelectric 1024
Supersonic Flaw 656
Diaphragm Control Valve 852
Diaphragm Type Valves, Corrosion Resistant 660
Dielectric Heating Generator 88
Drives, Turbine 88
Dry Chemical Fire Extinguisher 668
Dryers, Instrument Air 664
Drum and Barrel Hand Truck 854
Drum Clamp for Fork Truck 846
Dust Collector 1020
Self Contained 260

Electric Motors, Stepless Speed Adjustment 846
Electronic Servo System 850
Elevator, Portable 88
Explosion Tested Linestarter 662
Extension Spindle for Viscometer 260
Eye Washing Fountain 88

Fans, Axial Flow 856
Filter Cloth, Nylon 662
Filter Press, Portable 90
Finned Tubing, Coiled 494
Fire Extinguisher, Dry Chemical ... 668
Fire-Fighting Foam Spray 84
Fire Fighting, Wetting Agent for ... 664
Fittings, Light Gauge Pipe 264
Fittings, and Pipe, Polyethylene 666
Saran-lined 660
Flammable Vapor Detector 848
Flashlight, Rubber 494
Flaw Detector, Supersonic 656
Flexible Metal Hose, Seamless 256
Flexible Metal Tubing, Monel 854
Flexible Pivots 264
Foam Spray, Fire-Fighting 84
Foot Pump, Hydraulic 844
Fork Lift Truck, Revolving Carriage for 496
Fork Truck 500
Center Control 1020
Crum Clamp for 846
Pneumatic Tired 96, 266
Fountain, Eye Washing 88
Furnace, Vacuum 84
Gage, Corrosion Resistant Pressure.. 92
Gas Analyzer 94
Gas Combustion Assemblies, Pre-Engineered 844
Gas Detector, Combustible 1026
Gas Diffusion Tube 668
Gaskets, Teflon 256
Gate Valves, Plug 84
Gelatinizing Roll 666
Generator, Dielectric Heating 88
Totally Enclosed Unit-Cooled 656
Gloves, Patch Type Rubber 262
Governor, Pump 92
Gravity Conveyor, Light Weight Portable 666
Grinders 262

H_2S Removal 90
Hand-Held Electric Tachometer 1032
Hand-Operated Power Truck 496
Hand Pump 852
Hand Truck, Drum and Barrel 854
Handwheel Control Valve 260
High Pressure Condensate Return System 494
High Pressure Liquid Pump 844
High Temperature Insulating Material 662
Horizontal Belt Conveyor 498
Hose, Seamless Flexible Metal 256
Steam, Temperature Resistant 662
Hot Lime-Soda Water Softener 256
Humidity Measure 258
Humidity Sensing Element 1028
Hydraulic Foot Pump 844

Indicator, Pyrometric 666
Stepless Input Controller and Temperature 852
Induction Motor, Squirrel-Cage 656
Input Controller and Temperature Indicator, Stepless 852
Instrument Air-Dryers 664
Insulating Material, High Temperature 662

Light Gauge Pipe Fittings 264
Light Weight Portable Gravity Conveyor 666
Linestarter, Explosion Tested 662
Liquid Pump, High Pressure 844
Lubricant, Anti-Acid Pump 658

Magnetic Pulley 494, 498
Mat, Non-skid Rubber 1030
Metal Hose, Seamless Flexible 256
Metal Tubing, Monel Flexible 854
Meter, Area, for Viscous Liquids ... 258
pH 84
Portable Radioactivity 844
Meter-Equipped Hand Pump 1024
Mixer 1022
Change Can 496
Monel Flexible Metal Tubing 854
Motor, Squirrel Cage Induction 656
Stepless Speed Adjustment Electric 846
Totally Enclosed 3-Phase 660
Motor-Capacitor Servicing Kit 260
Motor Starting Capacitors 670

Neoprene Coverings for Wire Rope Slings 658
Nesting Ring, Pallet Rack and 848
Noise Reducer 88
Non-skid Rubber Mat 1030
Nylon Filter Cloth 662
Nylon Seat for Safety Valve 260

Oil Resistant Tape 264

Pallet, All Metal, with Nesting Ring.. 266
Pallet Rack and Nesting Ring 848
Pallet Stacker 664
Pallet Trucks, Side Shifter For 664
Patch Type Rubber Gloves 262
pH Meter 84
Photoelectric Detector 1024
Photoelectric Turbidity Recorder 848
Pilot Plant Rotameter Kit 856
Pipe Fittings, Light Gauge 264
Pipe and Fittings, Polyethylene 666
Saran-Lined 660
Pipe Supports, Roller 662
Pipeline Strainer, Continuous 256
Pivots, Flexible 264
Plug Gate Valves 84
Pneumatic Tired Fork Truck.....96, 266
Polyethylene Pipe and Fittings 666
Portable Elevator 88
Portable Filter Press 90
Portable Gravity Conveyor, Light Weight 666
Portable Radioactivity Meter 844
Positive Displacement Pump, Rotary.. 850
Power Truck, Hand-Operated 496
Pre-Engineered Gas Combustion Assemblies 844
Pressure Gage, Corrosion Resistant ... 92
Pressure Transmitter 498
Pressure Valve 94
Pulley, Magnetic 494, 498
Pump, Centrifugal Close-coupled Centrifugal 848, 1020
Hand 852
High Pressure Liquid..... 844
Hydraulic Foot 844
Meter-Equipped Hand 1024
Rotary Positive Displacement 850
Solids-Handling 90
Pump Governor 92
Pump Lubricant, Anti-Acid 658
Pyrometer Controller 662
Pyrometric Indicator 666

Rack and Nesting Ring, Pallet 848
Radioactivity Meter, Portable 844
Ramp, Bridge 86
Recorder, Photoelectric Turbidity 848
Strip Chart 1028
Regulator, Temperature 672
Relief Valve, Corrosion Resistant ... 658
Repeat Cycle Timer 1026
Respirator 656
Revolving Carriage for Fork Lift Truck 496
Roll, Gelatinizing 666
Roller Pipe Supports 662
Rotameter Kit, Pilot Plant 856
Rotary Positive Displacement Pump... 850
Rubber-Coated Utensils 266
Rubber Flashlight 494
Rubber Gloves, Patch Type 262
Rubber Tired Wheels 262

Saran-Lined Pipe and Fittings 660
Saturating Spray Air Conditioner 668
Screen, Vibrating 256
Seamless Flexible Metal Hose 256
Seat, Nylon, for Safety Valve 260
Self-Contained Dust Collector 260
Servicing Kit, Motor-Capacitor 260
Servo System, Electronic 850
Side Shifter for Pallet Trucks 664
Silver Solder 656
Solder, Silver 656
Solids-Handling Pump 90
Spargers, Stainless Steel 86
Speed Adjustment Electric Motors, Stepless 846
Spindle, Extension, for Viscometer... 260
Spray Air Conditioner, Saturating ... 668
Spray, Fire-Fighting Foam 84
Squirrel-Cage Induction Motor 656
Stacker, Pallet 664
Stainless Steel Spargers 86
Steam Hose, Temperature Resistant... 662
Stepless Input Controller and Temperature Indicator 852
Stepless Speed Adjustment Electric Motors 846
Strainer, Continuous Pipeline 256
Strainer, Y 94
Strip Chart Recorder 1028
Supersonic Flaw Detector 656
Swing Check Valves *494
Switch, Conveyor 96
Time 1026

Tablet Compressing Under Vacuum .. 494
Tachometer, Hand-Held Electric 1032
Tape, Oil Resistant 264
Teflon Gaskets 256
Temperature Indicator, Stepless Input Controller and 852
Temperature Regulator 672
Temperature Resistant Steam Hose ... 662
3-Phase Motors, Totally Enclosed..... 660
Time Cycle Controller 88
Time Switch 1026
Timer, Repeat Cycle 1026
Totally Enclosed 3-Phase Motors 660
Totally Enclosed Unit-Cooled Generator 656
Transmission, Variable Speed Hydraulic 1032
Transmitter, Pressure 498
Troughed Steel Belt Conveyors 90
Truck, Book, for Dryer 1024
Center Control Fork 1020
Drum and Barrel Hand 854
Fork 500
Hand-Operated Power 496
Pneumatic Tired Fork 96, 266
Tube, Gas Diffusion 668
Tubing, Coiled Finned 494
Monel Flexible Metal 854
Turbidity Recorder, Photoelectric 848
Turbine Drives 88

Utensils, Rubber Coated 266

Vacuum Furnace 84
Valve, Check 94
Corrosion Resistant 1030
Corrosion Resistant Relief 658
Diaphragm Control 852
Diaphragm Type, Corrosion Resistant 660
Handwheel Control 260
Plug Gate 84
Pressure 94
Swing Check 494
Valve Reseating Tool 500
Vapor Detector, Flammable 848
Variable Speed Hydraulic Transmission 1032
Vibrating Screen 256

Water Softener, Hot Lime-Soda 256
Zeolite 90
Wear, and Corrosion, Resistant Welding Alloy 660
Weigher, Continuous, for Dry Materials 256
Welding Alloy, Corrosion and Wear Resistant 660
Wetting Agent for Fire Fighting ... 664
Wheels, Rubber Tired 262
Wire Rope Slings, Neoprene Coverings for 658

Y Strainer 94

Zeolite Water Softener 90

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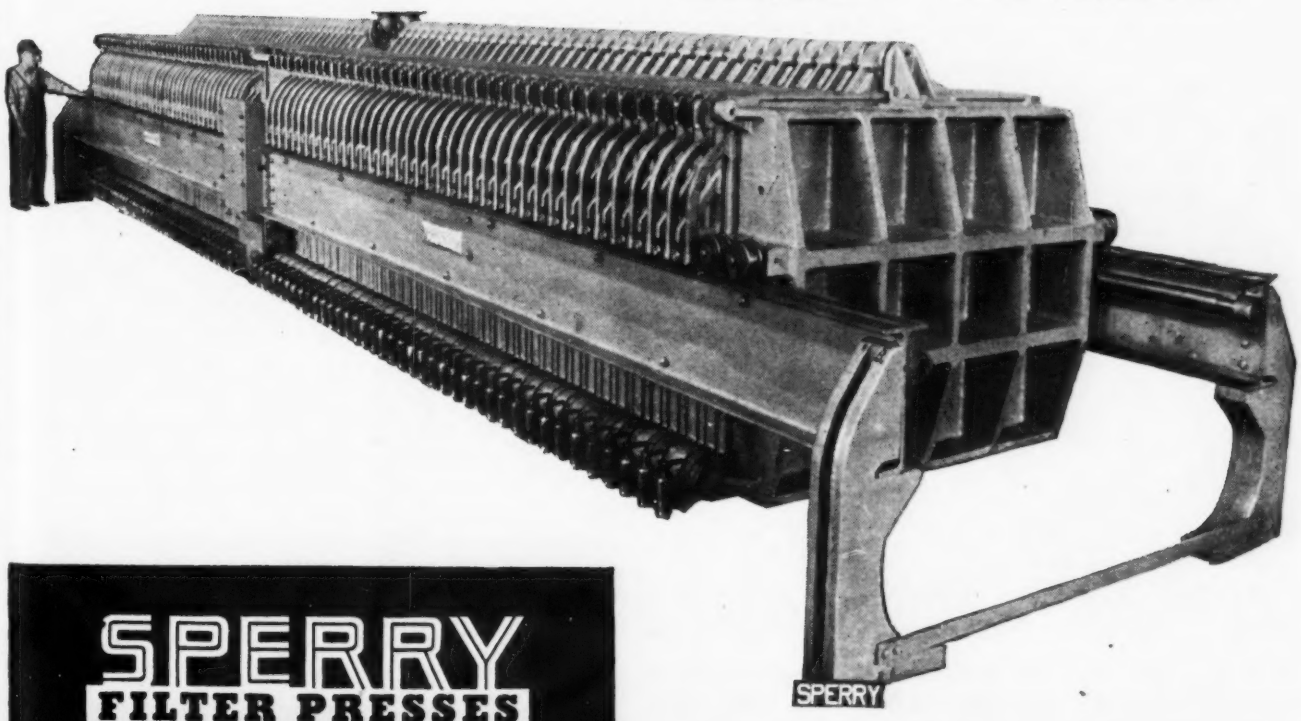

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PACKAGING & SHIPPING

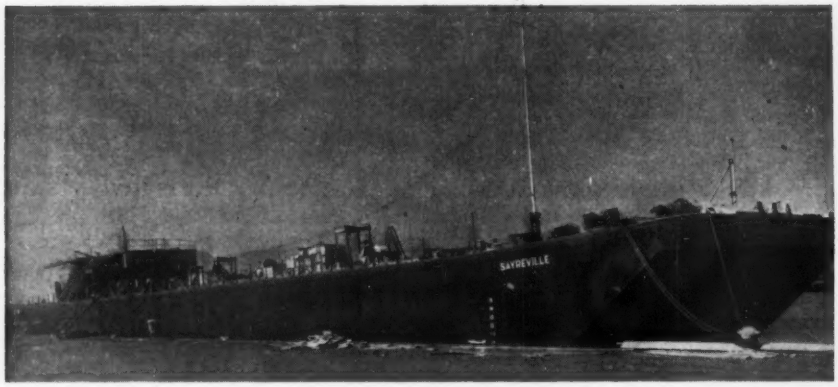
by T. PAT CALLAHAN

Rubber-Lined Tanks For Acid Disposal

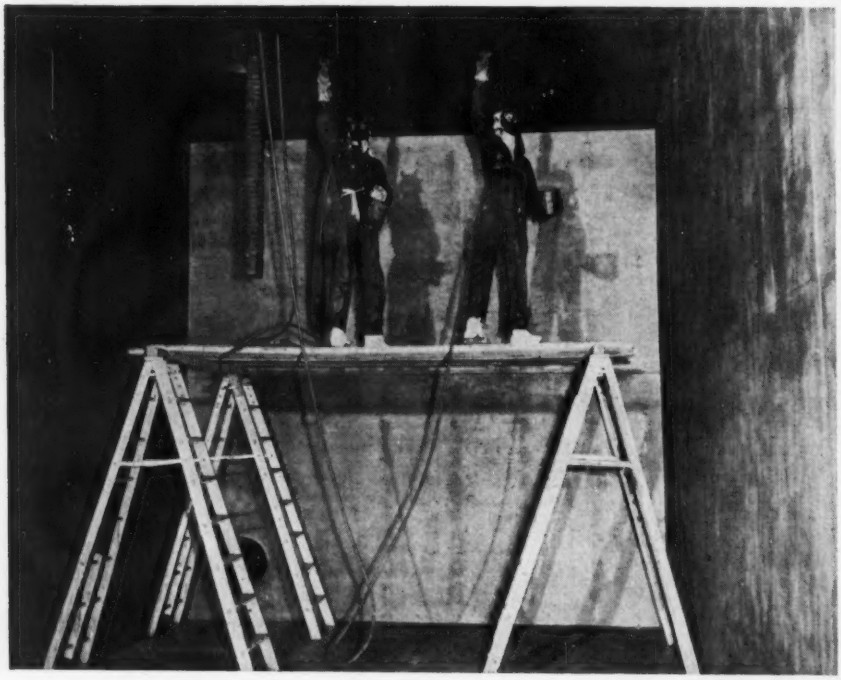
One of the largest jobs of lining tanks with rubber has just been completed by The B. F. Goodrich Company in the barge Sayreville, owned by the National Lead Company and used to haul dilute sulphuric acid waste from the company's plant between South Amboy and Sayreville, New Jersey, and dump it into the Atlantic 10 miles off the New Jersey coast. The method is the only practical one found by the company for this industrial waste problem and creates no hazards to health or to human and marine life.

Said to be the biggest non-propelled vessel ever built, the barge has an overall length of 264'3¼", breadth of 43', designed draft of 13'8", and displacement of 3925 tons. Approximately 2860 long tons of waste will be carried on trips scheduled 18 hours apart. Four hours are required to load and discharge the cargo.

Eight rubber-lined rectangular tanks carry the 8.5 per cent dilute sulphuric acid, while four others, also lined with rubber, hold the acid sludge or slurry



The barge Sayreville, of the National Lead Company, used to transport 8.5 per cent sulphuric acid waste from the company's titanium plant 10 miles off the New Jersey coast and dump it into the sea.



Field workmen of The B. F. Goodrich Company installing rubber linings on one of the eight main tanks of the barge, which takes 2860 long tons of sulphuric acid waste and slurry out to sea. Rubber for each of the main tanks weighs 3500 lbs.

RESULTS

Case History No. 16 . . .
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Packaging costs reduced 75%.

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Manufacturer saves ¾¢ per lb.; customer saves ½¢.

Case History No. 19 . . .
Sand Produc
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Case History No. 17—Multiwalls lend themselves to mechanical handling methods.

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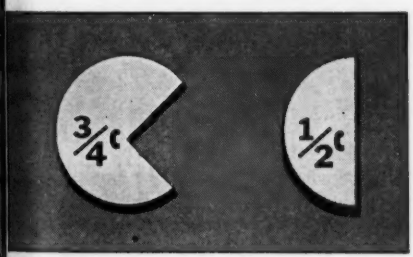
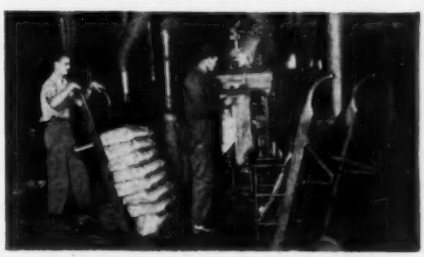


Case History No. 18—Producer saves ¾¢ per lb.; customer saves ½¢.

Case History No. 19 — Multiwalls protect against moisture-vapor penetration in transit and in storage.



Case History No. 20 — High-speed 152-PB valve bag filling machine gives cleaner, cheaper operation.

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containing about 25 per cent abrasive solids. Each rectangular tank is 44′ long, 15½′ wide and 15′ deep. Walls, floors and ceilings are lined with 3/16″ rubber, weighing 3500 lbs. for each tank.

The four slurry tanks are each 20′ high, 12′ in diameter, with a 7′ cone at top and bottom and are lined with ¼″ rubber. The acid is loaded from shore tanks, also rubber-lined, through 10″ rubber hose. All metal pipings and connections through which the acid passes also are rubber-lined.

Twenty tons of rubber and 1,500 gallons of cement to bond the rubber to the metal were used.

Explosives by Air

Of particular interest to shippers of chemicals is the following notice issued by the Civil Aeronautics Board pertaining to amendment of its regulations for the transportation of explosives and other dangerous articles by aircraft. The Safety Bureau has recommended to the Board amendment to Part 49 of the Civil Air Regulations particularly as they apply to acceptable inflammable liquids in specified quantities. This amendment will include articles not previously accepted, but can be transported in air commerce with an equal degree of safety. The amendment particularly refers to samples of aviation grade gasoline and oil and samples of inflammable liquids having a flash point of not less than 20 degrees Fahrenheit, excluding carbon bisulfide, ethyl chloride, ethylene oxide, nickel carbonyl, spirits of nitroglycerin, and zinc ethyl.

As soon as this amendment is accepted, it will be quoted in full in this column.

Drum Handler

The new Falstrom Drum-Karrier solves a problem wherever drums are handled in the plant, on loading platforms, or in outside yard operations. The Drum-Karrier is a rugged low-cost tool which makes an efficient drum handling system out of any monorail hoist, crane or chain fall, according to its manufacturer, the Falstrom Co., Falstrom Court, Passaic, N. J.

Initial installations in chemical, food processing, petroleum, metal working, paint and varnish, plastic, rubber and other industries have proved successful in speeding drum movements, dispensing contents, saving labor and promoting safety.

The new accessory features one-man operation and fits all standard size drums. It is always ready for service and can instantly be fitted to, or removed from, existing lifting devices. To use, the Drum-Karrier is simply hooked on to the hoist, moved to position, cinched around drum, and transported where needed. Positive tilt locks hold drum in vertical position and permit easy, controlled tilt-

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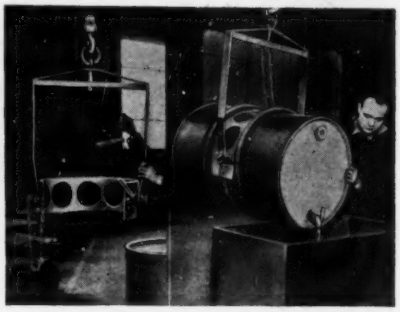
ing to mix or dispense contents over receiving tank. Designed and built for long hard service, it is of heavy-duty, all-steel construction.



Four simple operations permit one man to move and mount drum, and dispense all or part of the contents:

1. Hang Drum-Karrier on hoist hook and move to drum.
2. Bring saddle around girth of drum and cinch tight.
3. Raise hoist and move drum to position.
4. Pull out tilt locks and tilt drum to dispense contents.

ICC Regulations Amended

The Interstate Commerce Commission Regulations for the transportation of explosives and other dangerous articles was amended on October 27, 1947. Of particular interest to the shippers of chemicals and other dangerous articles were the following amendments:

Section 183 (Packing nitrates—exemptions) has been amended as follows:

(a) Nitrate of aluminum, nitrate of barium, nitrate of lead, nitrate of potash, nitrate of soda, nitrate of strontia, nitro carbo nitrate, nitrate of ammonia, nitrate of ammonia fertilizer, calcium nitrate and guanidine nitrate in metal cans, glass bottles, or other inside containers in outside fiberboard or wooden boxes, in kegs or barrels, in metal cans, metal drums or fiber drums are exempt from specification packaging and labeling requirements for transportation by rail freight, rail express, highway and by carrier by water.

(b) Ammonium nitrate, ammonium nitrate fertilizer, calcium nitrate, sodium nitrate, and guanidine nitrate in bags not exceeding 200 pounds net weight, moisture proof, tight against sifting and of strength not less than bags made of 8 ounce burlap are exempt from specification packaging requirements for transportation by rail freight, rail express, highway and by carrier by water. (See column 5 of Commodity List, Part 2 for maximum quantity that may be shipped in one outside package by express.) (See pars. [p] and [q], section 402.)

Section 303, Table par. (k) (Filling limit restrictions) has been amended for Trifluorochloroethylene permitting a maximum filling density of 115.

Specification 16A par. 1, has been amended as follows:

1. Compliance.—Required in all details. Authorized tolerances.—Cleats, battens, and handles, minus 1/32"; single

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thickness veneer, minus 5%; resawn boards, 1/64" below specified thickness for boards up to 7/32" thick and 1/32" below specified thickness for boards 1/4" or more thick.

Section 532 (h) (1) (Corrosive liquids) has been amended to read as follows:

(h) (1) Carboys of acids or other corrosive liquids must not be loaded into container cars. They must be so blocked, braced or stayed that they cannot change position during transit when being handled with reasonable care. Carboys of nitric acid must not be loaded into box cars more than two tiers high, except that completely boxed carboys, Specification 1D, may be loaded three tiers high. Car doors may be cleated in an open position if desired. Whenever practicable, flat or stock cars should be used for loading carboys of acids.

Section 548 (c) (Application of placards) has been amended as follows:

(c) Placards applied to the sides of cars containing explosives or other dangerous articles must be attached adjacent to the car initial and number, but must not be applied in a way that will obscure the initial or number.

Section 548 (d) (Application of placards) has been amended as follows:

(d) The use of tacks, having heads at least 1/4 inch across. At least 5 tacks must be used, one at each corner and one in the center of the placard, or when stapling devices are used the staples should be made of flat metal of not less than 19 gauge, and the space between the legs of the staples should be at least 3/8 inch and length of staples not less than 1/4 inch. At least 9 staples must be used, one row of three each across the top, center, and bottom of the placard. Tacks, nails, staples, or other devices used in previous application of placards must be removed when their presence interferes with proper application of placards.

There are numerous other amendments and additions included in this order particularly applying to carriers in the handling of placarded tank cars carrying explosives and other dangerous articles, handling of leaking packages and leaking tank cars in transportation, etc. Anyone who may be interested in these amendments or additions should consult the order as issued.

Part 7 of the regulation applying to shipments made by way of common, contract or private carriers by public highway (CFR 85) has been amended as follows:

Section 823 (e) (8) (Inflammable solids and oxidizing materials) has been amended to read as follows:

824 (e) (8) Ammonium nitrate, ammonium nitrate fertilizer, calcium nitrate, and guanidine nitrate in bags must be loaded in closed motor vehicles not of all metal construction or if open body vehicles are used the lading must be covered. Only clean vehicles must be used and must be free of any projections that would injure bags.

The Commission also included in the order regulations and specifications for containers particularly applying to the shipment of radio-active materials. These

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materials which are classified as poison Class D are covered in detail by specification regulations dealing with the classification packing and labeling of these radio-active materials.

Anyone interested in this should consult the order issued October 24, 1947.

New Products & Processes

(*Continued from page 1016*)

the alfalfa first and then dehydrates this high value fraction. This leaves the less valuable parts of the alfalfa for use as a feed near the fields where it grew.

Extraction of the pigments and the protein while the plant tissues are still fresh and moist results in easier separation and no damage to the quality of either the pigments or protein from heat or drying. Industrial experience with other proteins has indicated that this factor of extraction without heating improves the possibilities of supplying proteins that will be useful for industrial purposes. Industrial use of the plant pigments, chlorophyll, xanthophyll, and carotene include the use of carotene to replace vitamin A, xanthophyll as a poultry feed ingredient, and chlorophyll for pharmaceutical purposes and as an ingredient in air fresheners.

The essential machinery for the new process is not complicated. Fresh mowed alfalfa is run through a mill called a disintegrator. This separates the alfalfa into two parts, one high in fiber and the other rich in proteins and pigments. The protein-and-pigment fraction is put through a hydraulic press, and the juice from this pressing includes a large proportion of the most valuable proteins and pigments of the plant.

This juice can be spray dried to form a powdered concentrate of the valuable proteins, vitamins, and pigments that have led to wide use of alfalfa meal in poultry feeds. But the shipping weight of the concentrate is only a small fraction of the weight of the equivalent meal.

Instead of being dried, the juice may be warmed mildly to coagulate the protein and pressed again. The coagulated protein cake then has a protein value of about 80 percent. The juice pressed from the coagulated protein includes a high concentration of coloring matter and vitamin values that would be of use to industrial and chemical concerns, or in feeds.

Scientists consider that the present status of alfalfa, as an agricultural product with industrial possibilities, is comparable to the situation of soybeans 20 years ago. Production of alfalfa meal has increased five to seven times in the last ten years. Research will be continued to develop the most profitable ways for utilizing each of the separated products.

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Merck & Co., Inc. is now in a position to supply your requirements for the following Quinine salts:

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Quinine Phosphate
Quinine Salicylate
Quinine Sulfate

Quinine and Urea Hydrochloride

Now entirely free from Government control, these Quinine salts are available for the manufacture of proprietary products, cold tablets, chill tonics, industrial and other products, as well as for antimalarial therapy.

Cinchonine and Cinchonidine in the form of alkaloid and usual salts, as well as minor Quinine salts, will be available soon. It is expected that Quinidine Alkaloid and Sulfate will continue in short supply and hence remain under allocation.

We Invite You to Write Us Regarding Your Manufacturing Problems and Requirements

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PLANT OPERATIONS NOTEBOOK

How to Cut Causes of Occupational Dermatitis

Improper use of industrial solvents is the third largest cause of occupational dermatitis, or skin disease, accounting for 7.8% of all such cases. 78 of every 100,000 workers suffer from solvent dermatitis yearly. It may be estimated further that each year 1,560 cases of solvent dermatitis of sufficient severity to be compensable occur, with a financial loss, including wage loss and the cost of medical care, of about $312,000.

Solvents are used in industry to dissolve oils and fats. Similarly, if solvents are allowed to come in frequent or prolonged contact with the skin, they may dissolve the natural secretions of the skin glands and the fatty ingredients of skin tissue. This leads to drying, cracking, and fissuring of the skin, forming portals of entry for subsequent infection.

Treatment of dermatitis is the province of the industrial physician. Preventive measures, however, may well be put into effect by plant management. Hypersensitive workers should be assigned to work that does not involve the use of solvents. All workers should be instructed to avoid skin contact with these liquids as much as possible. Where feasible, a totally or partially enclosed process is the most effective means of preventing direct body contact.

Though specific protective measures depend for their effectiveness on the type of solvent and conditions of use, those outlined below are generally applicable:

1. Personal Cleanliness: The worker's

NOMOGRAPH-OF-THE-MONTH Edited by DALE S. DAVIS

Aluminum Sulfate Nomograph

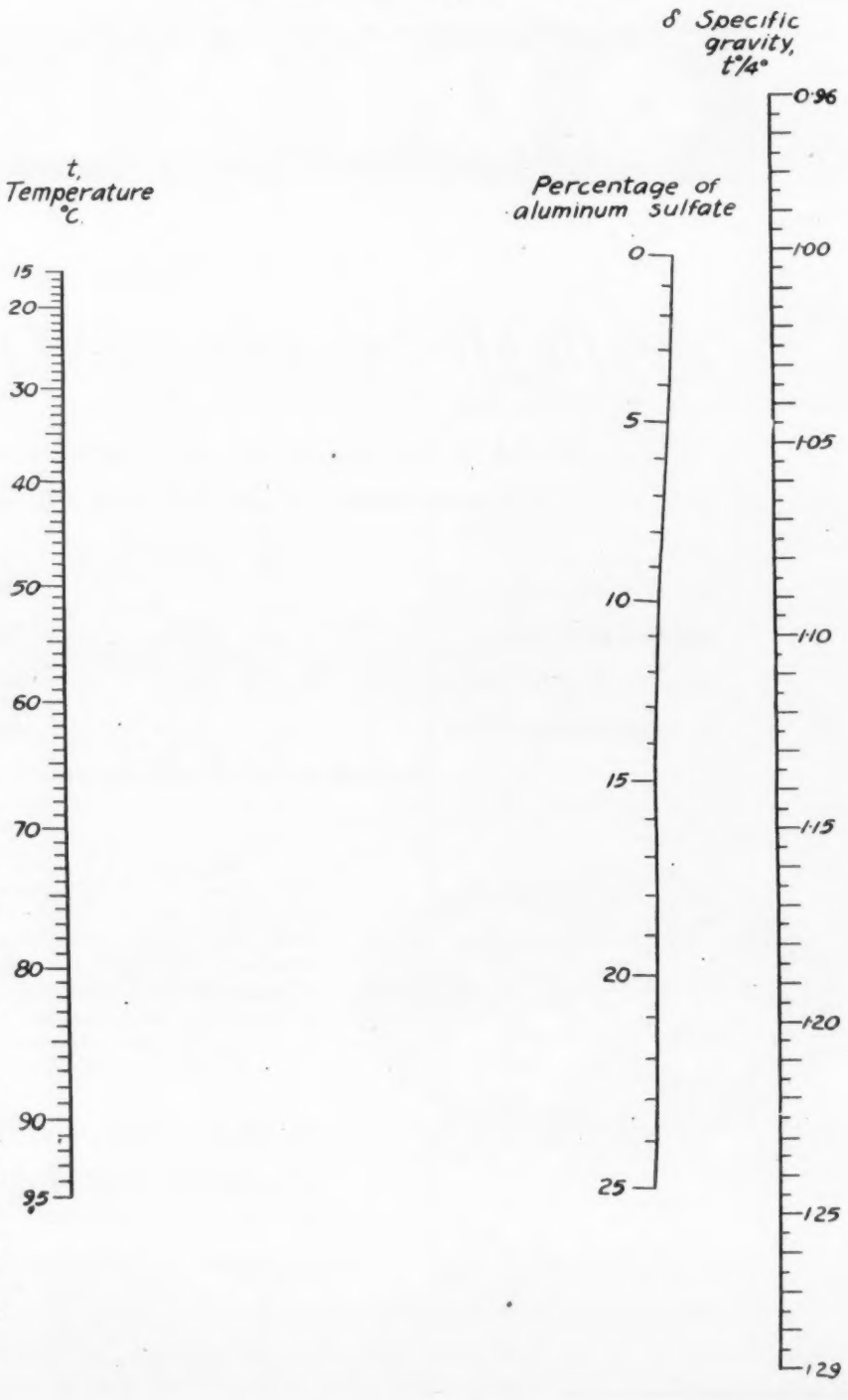
By D. S. DAVIS
Government Laboratories, University of Akron

THE accompanying nomograph enables calculation of the percentage concentration of aqueous solutions of aluminum sulfate when the temperature (t, °C) and specific gravity (δ at t°/4°) are known. It is based on data given by Silva and Chenevey[3] that are correlated by equations of the form of

$$\delta = a + b\,[t + 0.005\ (t\text{-}55)^2]$$

where a and b depend on the percentage of anhydrous aluminum sulfate present.

The use of the chart, constructed by methods described previously,[2] is illustrated as follows: What is the percentage concentration of anhydrous aluminum sulfate in an aqueous solution that has a specific gravity of 1.1100 at 36° C.? Connect 36 on the t scale with 1.1100 on the δ scale and read the desired value at 11 per cent. The present chart is in close agreement with that of Bogard and Davis[1] which was limited to lower percentages of aluminum sulfate.



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1. *Bogard, H. N. and Davis, D. S., Paper Ind. and Paper World, 21, 657 (1939); "Chemical Engineering Nomographs", Fig. 139, New York, McGraw-Hill Book Co., 1944.*
2. *Davis, D. S., "Empirical Equations and Nomography", Chap. IX, New York, McGraw-Hill Book Co., 1943.*
3. *Silva, J. W. and Chenevey, J. E., Ind. Eng. Chem., 37, 1016 (1945).*

CHEMICAL INDUSTRIES *will be happy to receive any charts which you may have developed so that they may be shared with your fellow engineers. The authors of each chart published will receive an honorarium of $10.*

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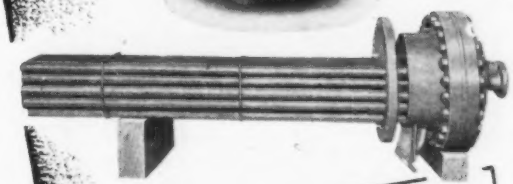
★ CONDENSERS



We have two experiences to offer in connection with your requirements along the above lines: (1) many years of experience in the design and construction of many types of heat transfer equipment; and (2) many years of experience in working with the stainless steels as used for such equipment.

Our engineers will be glad to work out the proper design of equipment to meet your requirements or help your engineering staff in any way if you prefer to do your own designing.

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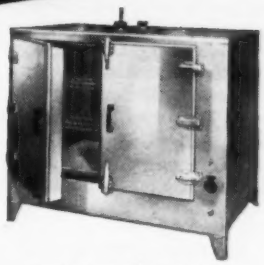

Double door model. Working chamber 37" x 19" x 25".

Designed for dependable, heavy-duty, constant temperature performance, "Precision"-Freas Gravity Convection Ovens are finding ever-increasing use in the modern laboratory. For baking, evaporating, sterilizing, moisture tests, heat-treating, annealing and conditioning, etc., these ovens offer a degree of temperature accuracy and uniformity unequalled by any comparable equipment.

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Ovens are of all-metal, double-walled construction, with simplified electrical control. Interiors are built of corrosion-resistant 18-8 stainless steel, exterior in your choice of stainless steel or rust-resistant iron. Write for detailed catalog No. 330-D.

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CABINET SIZE Width	Depth	Height	OVERALL SIZE Width	Depth	Height	Temperature Range	Watts	Model Number
13" x 14" x 13" Single Door			25" x 22" x 28"			35-180°C	600	100
						35-260°C	1200	104
25" x 19" x 19" Single Door			37" x 27" x 34"			35-180°C	1200	120
						35-260°C	2400	124
19" x 14" x 19" Single Door			31" x 22" x 34"			35-180°C	800	130
						35-260°C	1600	134
37" x 19" x 25" Double Door			49" x 27" x 40"			35-180°C	1800	140
						35-260°C	3600	144

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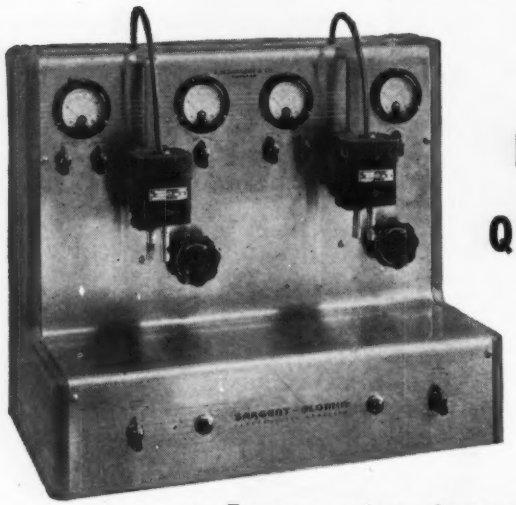

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Designed for continuous trouble-free performance

The new Sargent-Slomin Electrolytic Analyzers represent a complete re-design of the original Slomin instruments. Each unit is mounted within a case consisting of a one-piece stainless steel panel, beaker platform and apron with sturdy end castings. All models are completely self-contained and operate from 50-60 cycle electric circuits—no auxiliary generators or rheostats are required.

The two position analyzers consist of two complete, independently operating analyzer circuits. Duplicate or check analyses can be run at the same time or two different analyses can be run simultaneously at different current densities.

The central electrode is rotated by a new synchronous capacitor wound motor, operating at 550 r.p.m., especially engineered for this application. Under development for five years, this motor has been thoroughly tested and approved for continuous operation. Fully enclosed for protection against corrosive fumes—the shaft, sleeve bearings, and cap are made of stainless steel.

Outstanding features of this rugged motor are:

Greater output than any motor of similar characteristics and size.

No internal switches or brushes.

No "permanent" magnets—full output for long service life.

Fully synchronous—no speed change with change of load.

All parts of the new electrode chucks are made of stainless steel. A simplified design utilizes a positive retaining spring which permits quick, easy insertion of the electrodes and maintains proper electrical contact.

These new analyzers used with the specially designed high efficiency corrugated electrodes rapidly produce smooth, close grained deposits at maximum current density.

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Michigan Division: 1959 East Jefferson, Detroit 7, Michigan

S A R G E N T

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first line of defense is thorough, regular washing with a good cleanser—containing no harsh abrasives, alkalies or strong solvents—and warm water. Washing of exposed areas should be the rule after each work period.

2. Protective Clothing: If prolonged or frequent direct contact with a solvent cannot be avoided, the worker should wear protective clothing, which should always be properly cleaned, serviced, and disinfected.
3. Protective Ointments: So-called barrier creams and lotions, said to be impervious to particular chemicals, may also be used to advantage. They are especially desirable for areas not protected by special clothing. Most of them can be removed simply by washing with soap and water. After work, a bland, vanishing-type cold cream should be applied to replace the lost natural oils and to prevent cracking of the skin.

Manufacturers of protective clothing and ointments can advise on the types most suitable for the particular solvents in use.

Open Bottling of Ethyl Chloride

Two problems are presented when ethyl chloride is bottled in the open. This highly volatile liquid is dangerous because of its anesthetic properties, and it is explosive in the proper mixtures with air.

The use of refrigeration, however, lessens both of these hazards. In one installation, where small quantities are bottled, a walk-in cooler kept at 32° F. is used for initial cooling of the drums of the material. About six hours are required to reduce the temperature of the 200 lb. drums to a safe level below the boiling point of ethyl chloride (53° F.).

When a drum is opened, two ¼" copper tubes are inserted through a special bung placed in the opening. One tube extends just below the head of the drum for the admission of nitrogen at a pressure of about 4 psi. The nitrogen forces the contents of the drum out through the other longer tube. The liquid ethyl chloride is then filtered through a disc type filter.

After filtration the ethyl chloride is further cooled by Freon in an annular heat exchanger and then bottled. A foot pedal controls the valve for the bottle-filling operation. With this set-up 4 oz. bottles of ethyl chloride can be filled at the rate of 1500 bottles per hour.

Two separate compressors are used—one for the walk-in cooler and one for the final cooling of the filtered ethyl chloride. Location of these units outside of the filling room obviates the necessity of using explosion-proof motors.

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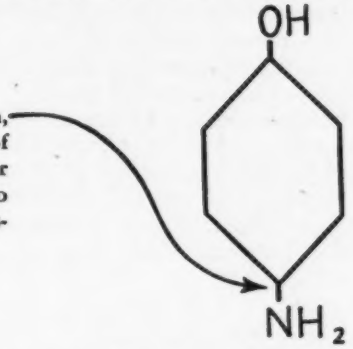

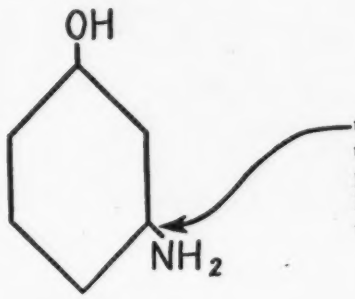

When Eastman puts the amino group in this position, you get meta-aminophenol that penetrates deep within animal fibers to guarantee real permanence for the olive-toned oxidation dyes formed. By condensation reactions it can also be synthesized to fast, beautiful red rhodamine dyes.

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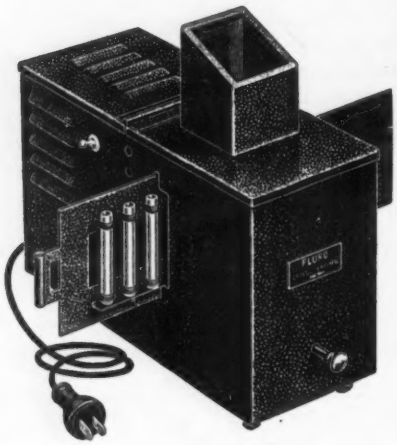
Designed to determine visually the concentration of fluorescent solutions by comparing an "unknown" with that of a series of known (standard) concentrations. The increase in analytical methods involving Fluorochemistry is evidenced each month in technical journals. Numerous analysis of organic and inorganic compounds, by fluorescent technique, are used in Pharmaceutical, Medical, Food, Oil, Rubber, Dye and Metal Laboratories.



The visual Fluro-comparator is constructed for simplicity of operation and comparisons can be made rapidly and with ease. The instrument operates direct from the AC line and is unaffected by voltage variations, temperature or humidity.

Over one hundred of these units are now in operation in many different types of analysis. The Fluro-comparator permits investigation in the field of fluorescence at a nominal equipment investment for the first time.

Model "A" Visual Fluro-comparator complete with mercury vapor lamp, transformer, filter adapters and one dozen selected flat bottom tubes.

A bulletin is in preparation listing filters and accessories, detailed description of the instrument and a complete reference to published literature. Write for your copy today.

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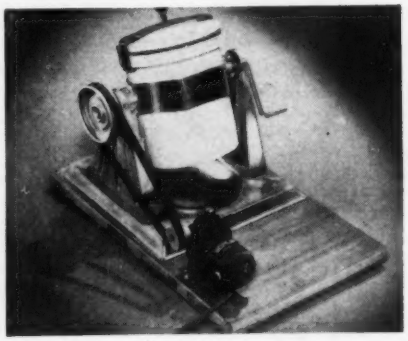
LABORATORY NOTEBOOK

Tumbling Jar

A new motor-driven Tumble-Jar is being manufactured by Andrew Technical Service, 111 E. Delaware Place, Chicago, Ill. Powered by a gear reduction motor,



it rotates a glazed chemical stoneware jar, 6" diameter by 8" high, at a speed of approximately 55 R. P. M.

Owing to the heavy weight of the glazed jar, it can also be used as a ball mill. The jar has a reinforced rim and stoneware cover which fits tightly against the soft rubber gasket by means of a metal clamp, making it leak-proof in use. Overall dimensions are 14 x 22 x 15" high. The motor will operate on 115 volts A. C. 60 cycles or D. C.

In chemical process work, the unit is applicable to research operations and pilot tests on chemicals, drugs, pharmaceuticals, coloring agents and dyes, inks, pigments and paints. It can be used for blending, mixing, dispersions, emulsions and colloids. Liquids and solids can be handled. Industrial applications include small scale tumbling, deburring, and plating operations—for metal parts, ceramics, rubber and plastic materials. It may be used in the textile and food industries.

Technique for Crystal Identification

A single particle one thousandth the size of a pinhead can be examined and chemically identified by a new and more accurate microscopic technique which was developed at Queens College.

The method, which has been applied successfully to many substances, chiefly pharmaceuticals, depends on observation of characteristic melting points and refractive indexes.

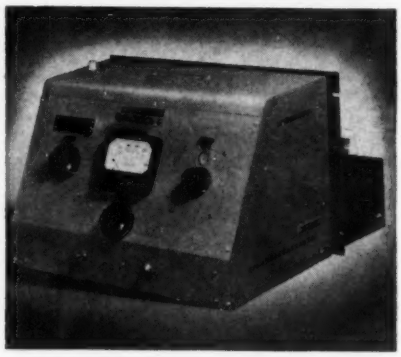
A crystal, which may be too small to be visible to the naked eye, is placed in a heater under the lens of a microscope, and delicate measurements are taken when it melts. The use of individual crystals decreases the probability of errors that might be caused by chance impurities or modifications of the substance under observation.

Experts in petrography, a branch of geology dealing with the structure and composition of rocks, have made extensive use of a similar technique involving measurements of the refractive indexes and shapes of rock crystals but, although the method has achieved notable success in petrography where the number of crystal types encountered is relatively small, it is not generally applicable to the problems of the chemist.

As a further aid in the identification of substances by microscopy, the melting points and refractive indexes of mixtures have been studied, so that now it is possible to determine the identity of an unknown substance mixed with a known material. This approach has been used to obtain data for substances which decompose before their normal melting points are attained.

Capacitance Bridge

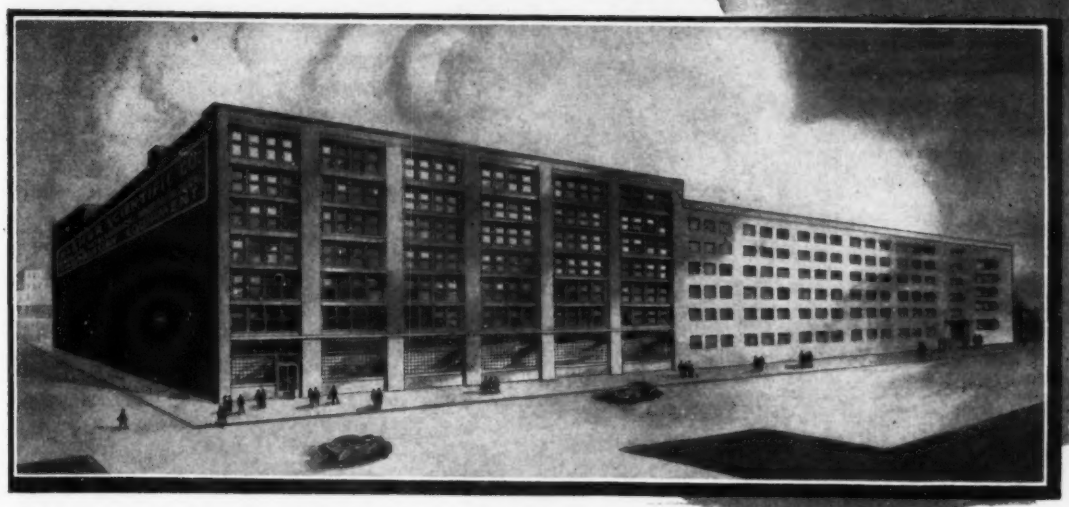
A capacitance bridge suitable for measurement of capacitance in multi-electrode systems is now available from the Electronics Division, Sylvania Electric Products Inc., 500 Fifth Avenue, New York



18, N. Y. Particularly useful in measuring interelectrode capacitances in vacuum tubes, it provides a range of 0 to 100 micromicrofarads through the use of five multipliers and measurement at 465 kc. Direct capacitance accuracy of 1% and direct conductance accuracy of 10% are provided when calibrated with standards of commensurate accuracy.

The bridge consists of three separate sections including r-f signal generator and power supply; r-f amplifier, detector and vacuum tume voltmeter; and associated switches, controls and 500 microampere meter indicating bridge balance. Ground to lead or jig capacitance may be tuned out when combined values do not exceed 25 micromicrofarads. Special tube

Taking Care of
THE LABORATORIES' NEEDS



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tester adapters are available for measurements with or without base shield or metal shell connected to tube element or ground.

Type 125 Capacitance Bridge is rated at 45 watts, 110-120 volts, 50-60 cycle a-c; weighs 50 pounds; and measures 19 inches long and 12¼ inches high. Tube complement includes 5Y3G, 7A6, 7B4, OC3 and two 7A7. Rated capacitance ranges in micromicrofarads are: 0-0.01; 0-0.1; 0-1; 0-10; and 0-100.

Oscilloscope Camera

Fairchild Camera and Instrument Corp., 80-06 Van Wyck Blvd., Jamaica, N. Y., has made an Oscillo-Record Camera, operated on electronic principles. It is the first camera especially designed for general purpose use in recording oscilloscope traces.

Equipped for mounting atop standard laboratory oscilloscopes, this 35-mm. camera, which makes still or continuously moving film records, photographs high

speed phenomena, as well as very low speed phenomena (too low for visual continuity). It is also used for quantitative studies of oscilloscope traces, for record purposes, and for tests using new multiple-beam tubes.

By using the sweep circuit of the oscilloscope in conjunction with the variable speed drive, the speed of the trace photographed is limited only by the writing speed of the oscilloscope itself. By adjusting the speed of the film, the camera records each successive sweep across the film without the use of a shutter. If desired, the moving film can be used as the sweep, giving a continuous recording along the film. The film rate is continuously adjustable from one inch per minute to 3,600 inches per minute (or five feet a second).

For continuous strip photography, the rate of film movement is governed by an electronic control giving a speed variation of 60-to-1, continuously adjustable throughout this range by means of a calibrated dial.

The camera takes standard 100-foot rolls of 35-mm. film, or film in standard 400-foot or 1,000-foot magazines.

Provision is made for recording on the film any hand-written data, by means of an illuminated card supplied with the camera.

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INDUSTRY'S BOOKSHELF

Textile Fibers

TEXTILE FIBERS, fifth edition. By *J. M. Matthews* and *H. R. Mauersberger.* John Wiley and Sons, 1947. 1133 pgs., $12.50. Reviewed by Robert Burns, Celanese Corp. of America.

HERBERT R. MAUERSBERGER and his well-chosen group of collaborating specialists have produced, in the Fifth Edition of Matthews' "Textile Fibers," a work which should prove of great value not only to students preparing to enter the textile industry but also to those engaged in its various phases or in supplying its needs.

Comprising twenty-four chapters, it deals with all of the fibers in considerable detail as far as their properties are concerned and in the case of the man-made materials, goes into their manufacture as well. Fiber identification, analysis and testing are also well covered. It is particularly complete with regard to photographs, photomicrographs, and other illustrations as well as data tables and the bibliographies which appear at the ends of the chapters will be useful to those engaged in detailed studies or research.

Previous editions of Matthews' "Textile Fibers" have been held in high regard and the revising and augmenting which has been done by Mr. Mauersberger and his associates in producing the fifth edition will certainly not harm its reputation.

Textile Flameproofing

FLAMEPROOFING TEXTILE FABRICS, by *Robert W. Little,* Reinhold Publishing Corp., New York, 1947. 410 pp., $6.75. Illustr. Reviewed by Milton Harris, Harris Research Laboratories, Washington, D. C.

THE TEXTILE industry, like most industries, received great impetus during the war, and as the result of accelerated research and development programs, made great studies in many fields. An outstanding example, brought about largely as a result of the efforts and support of the Office of the Quartermaster General, is found in the field of flameproofing of textile fabrics. This timely and well written book, prepared by a staff of competent specialists under the editorship of Robert W. Little, represents the combined achievements of many civilian and military organizations.

The book not only reports a series of researches, sponsored by the Office of the Quartermaster General, which undoubtedly constitute the first extensive study of the fundamentals of flameproofing, but also covers the art and technology in the methods of application of flame-proofing treatments, and the methods of evaluation of fabrics so treated. It contains excellent discussions of the objectives of flameproofing for civilian as well as military purposes, degradation reactions of cellulose, the fundamentals of the prevention of afterflaming and afterglow, test methods, and in addition surveys the available treatments and the industrial techniques employed in commercial practice.

The book is recommended as an excellent reference work and should serve as a stimulus for further research and development in this important field. In view of current restrictions and proposed legislation, it should be considered a must by all those engaged directly or indirectly in the production of flameproof fabrics.

Cellulose Industry

WOOD PULP AND ALLIED PRODUCTS, by *Julius Grant.* Leonard Hill, Ltd., 17 Stratford Place, London, 1947; 312 pages. Reviewed by Robert S. Aries, Polytechnic Institute of Brooklyn, N. Y.

THE SECOND edition of Dr. Grant's book under a revised title is a readable and instructive volume on the subject of this most important raw material. Even though the book is primarily intended for non-technical readers, useful references to the original literature are provided. In fact, most of the latter is American, especially TAPPI publications up to 1945.

The author does not claim an exhaustive treatise and one could not be written in a volume. After treating the history of pulping, he looks into the chemistry of cellulose and the identification of woods. The various pulping processes are interestingly described, followed by chapters on wood by-products, testing methods and uses of wood pulp.

Comparing Dr. Grant's book with other one volume efforts, one would conclude that it is the most readable. However, it lacks the engineering aspects (even though mostly obsolete by now) of Witham's "Modern Pulp & Paper Making," nor the technical wealth of Sutermeister's "Chemistry of Pulp and Paper." The heavy reliance on the literature creates further drawbacks, while the statistical material is generally obsolete and superfluous. This reviewer has little use for tables over 30 years old on the forest areas, including Austria-Hungary (nonexistent since 1919) yet not mentioning any central or South American country. The long discussion on wood flour does not appear to be related to the topic, while very few of the items in the chapter on "by-products" have seen commercial daylight.

The book should be of much interest to the inquisitive layman, general reader and executive in the pulp and allied fields. Technical men will find some use of the interestingly woven background material and the use of references. The volume is well worth the attention of anyone concerned with the cellulose industries.

Organic Pigments

THE CHEMISTRY AND PHYSICS OF ORGANIC PIGMENTS, by *L. S. Pratt.* John Wiley & Sons, New York, N. Y., 1947; 359 pp., 103 illustrations and charts, 16 tables. Reviewed by A. L. Fox, General Aniline & Film Corp.

THIS informative book gathers under one cover a wealth of information now widely scattered in other books and in journal articles. It comprises twelve chapters dealing with the history of pigments, chemical constitution and physical structure, intermediates, natural and synthetic pigments, testing and identification of pigments, and a discussion of their uses and properties.

The chapters on identification of pigments and their evaluation are especially valuable inasmuch as they are dealt with in considerable detail. The chapters on intermediates and synthetic organic pigments are fairly comprehensive and valuable tables covering the chemical constitutions of the Naphthol AS range of intermediates and the amine bases are given.

Although the relationship of physical structure to final properties is one of the most important features in the proper understanding of pigments and is frequently mentioned throughout the book, the chapter dealing specifically with this relationship is only thirteen pages long. It is believed this phase of the subject could have been developed more exhaustively with profit. The little understood relationships between ultimate particle, aggregate and agglomerate are clarified.

The book will be of greater value to users of pigments than to makers of pigments. While many specific directions are given on how to use and identify the pigments, none are given on the laboratory or plant preparation of them.

The book is unusually well supplied with chemical structural formulas, in fact many reactions are given in much greater detail than necessary. The publishers are to be congratulated on the fine reproduction of the many formulas employed and the excellent quality of paper used.

The bibliography comprises 148 references which while not exhaustive do cover the most important references. The book is exceptionally well indexed, 34 pages being devoted to it.

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missing that would have made the work of greater value and that is a glossary of terms used.

Volumetric Analysis

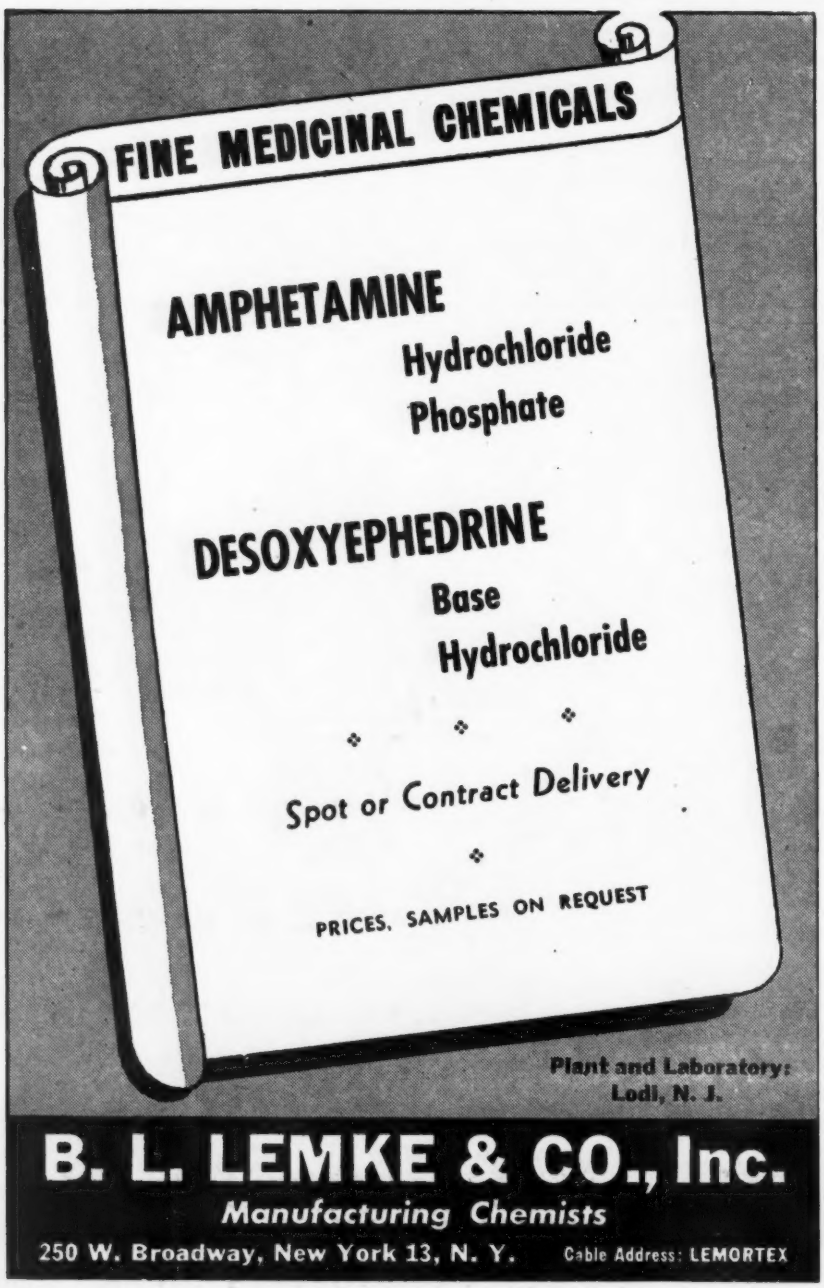
VOLUMETRIC ANALYSIS, Volume 2, second revised edition, by *I. M. Kolthoff* and *V. A. Stenger*. Interscience Publishers, Inc., New York. pp xiii + 374. $6.00. Reviewed by Sidney Ross, senior chemist, Clinton National Laboratory.

THIS BOOK follows the plan of the first edition, published nearly twenty years ago, but contains so much additional material that it could well be considered a new work. This volume contains half the proposed discussion of practical titration methods, and includes acid-base, precipitation and complex-formation reactions. The subject of oxidation-reduction reactions is to be discussed in the final volume. The first volume, published in its revised form in 1942, should not be left out of this account, as it contains precisely the best treatment of the theoretical fundamentals of volumetric analysis that has yet been written. Those who use the second and forthcoming third volumes will find that they can do so more intelligently, and hence more rewardingly, if they make frequent reference to the first volume.

The combination of academic and industrial experience that is represented by the co-authorship finds a happy counterpart in the arrangement and treatment of the material. Each method is discussed as a member of a group having the same underlying theory. More frequently than in other practical manuals is reference made to theoretical principles. At the same time the book is clearly meant to be quite other than a collection of practical "illustrations" to the theory. A wealth of methods is included, organic as well as inorganic, with applications throughout the whole range of the common industrial analytical requirements.

A theoretical treatment of titration error is included for all methods amenable to that approach. Many other methods included have apparently been tested in the laboratory, evaluated and sometimes improved by Professor Kolthoff and his collaborators. A critical discussion of primary standards is also included. All this gives the book an additional character. As well as being a useful compendium for reference purposes, it is an authoritative, critical survey of its subject.

The style of writing, although often colloquial, is succinct and generally unambiguous.



Chemical Dictionary

ENGLISH-SPANISH CHEMICAL AND MEDICAL DICTIONARY, comprising terms employed in medicine, surgery, dentistry, veterinary, biochemistry, biology, pharmacy, allied sciences and related scientific equipment, by *Morris Goldberg, chief technical translator, Translation and Research Bureau, New York*. 1st. edition. New York & London, McGraw-Hill Book Company, Inc., 1947. ix, 692 p. $10.00. Reviewed by T. E. R. Singer, Technical Literature Consultant.

THIS IS a work that should be of great use to pharmaceutical companies that export to Spain and to South American countries, with the exception of Brazil; to translators in Spanish-speaking countries, and to their correspondents in the United States. The chemical material that has been included relates to the medical sciences that form the greater part of the contents. Industrial chemistry and chemical engineering have not been considered. The Spanish-English part of this work, in preparation, will be of even greater value to chemists in this country.

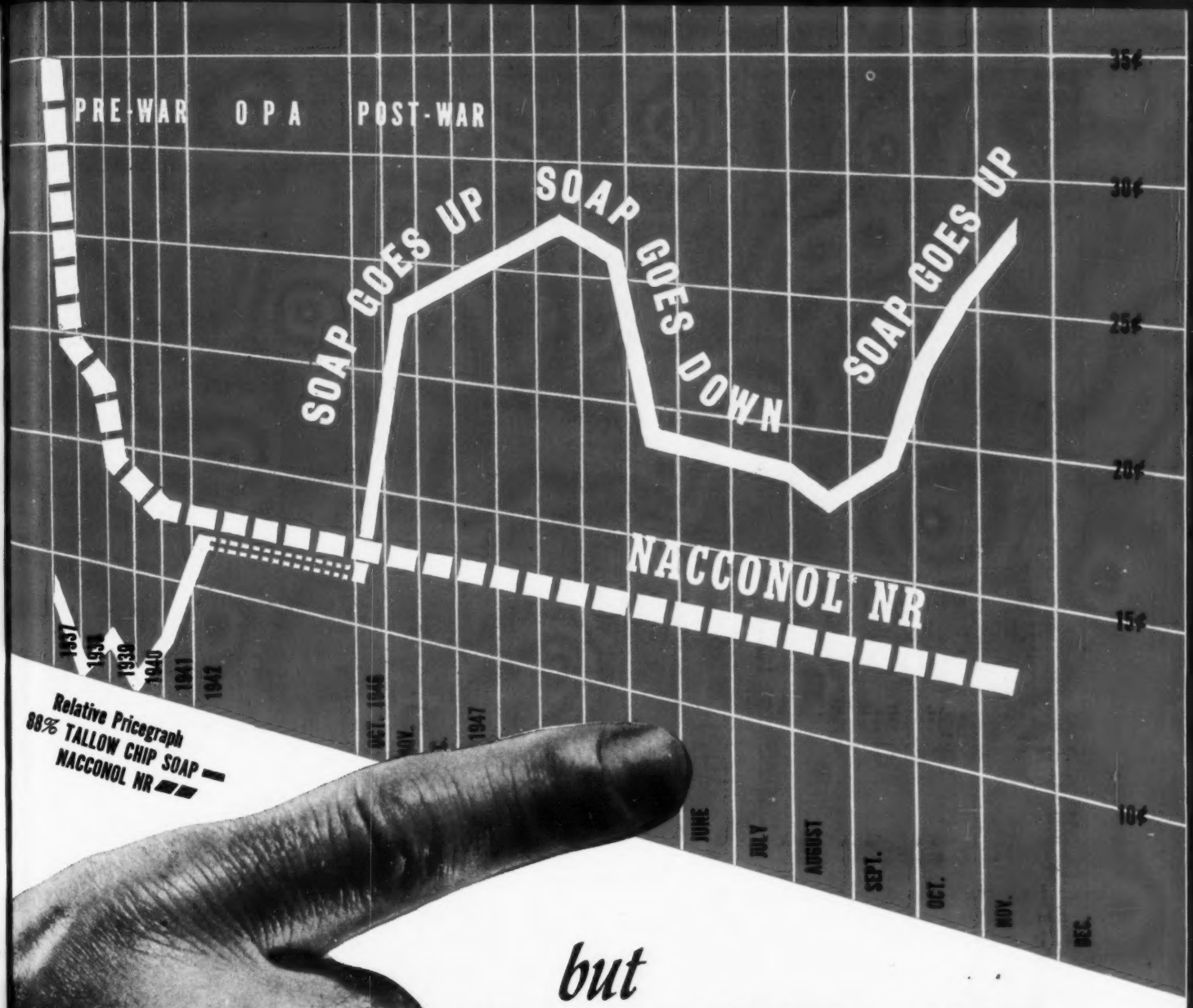
Other Publications

DIRECTORY OF THE SOCIETY OF THE PLASTICS INDUSTRY, INC., 1947 revised edition, lists the SPI company and individual membership and products with their manufacturers. The Canadian section is listed separately. SPI, 295 Madison Ave., New York, N. Y. $3.50 to members, $4.50 to non-members.

COMPILATION OF LAWS, a ready reference to various Federal and State laws dealing with insecticides, disinfectants and caustic poisons. In addition, there are regulations covering enforcement and interpretation of the laws and a chart showing the basic requirements of each state. National Association of Insecticide and Disinfectant Manufacturers, Inc., 110 East 42nd St., New York 17, N. Y. $25.00.

TRENDS IN WORKMEN'S COMPENSATION AND EMPLOYEE BENEFITS, a compilation of discussions on trends in workmen's compensation and various compensation plans. Insurance Series No. 65, American Management Association, 330 West 42nd St., New York 18, N. Y. $0.75.

REPORT ON STANDARD SAMPLES FOR SPECTROCHEMICAL ANALYSIS, tables and tests on iron and steel, aluminum, magnesium, zinc, lead, tin and copper alloys and other materials. A. S. T. M. Headquarters, 1916 Race St., Philadelphia 3, Pa. $1.25.



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"Polyco 117H, Polyvinyl Acetate Copolymer Emulsion". 4 pgs., Technical Data Sheet P1, American Polymer Corp.

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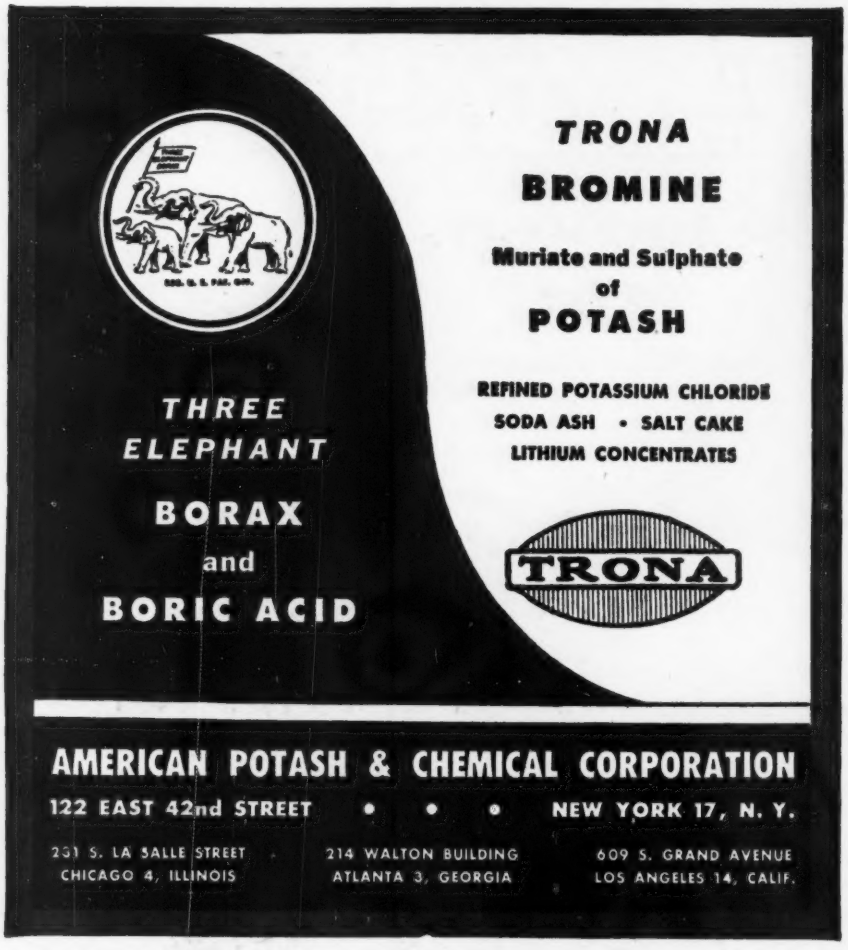

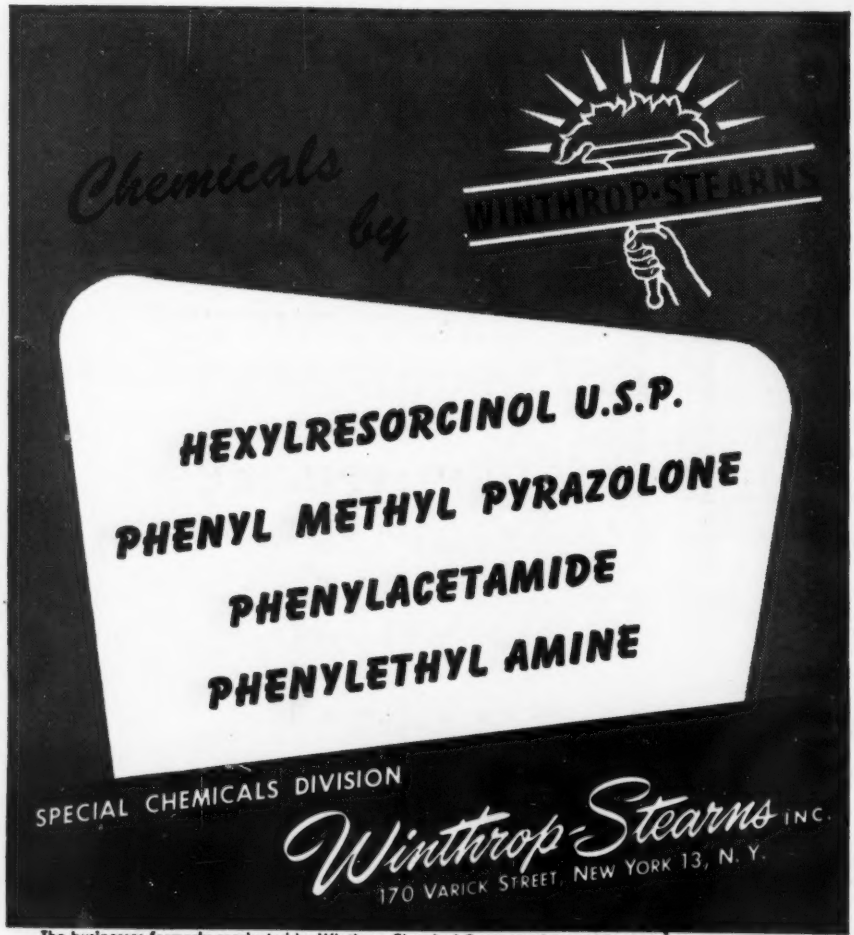

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CUMAR* Paracoumarone-Indene Resin
Carbonex* Rubber Compounding Material
Bardol* Rubber Compounding Material
Cyclohexanol
Flotation Agents
Anhydrous Ammonia
Ammonia Liquor
Sulphate of Ammonia
Ammonium Nitrate
Arcadian* The American Nitrate of Soda

* Reg. U. S. Pat. Off.

NEWS OF THE MONTH

Chemical Profits Rank Well

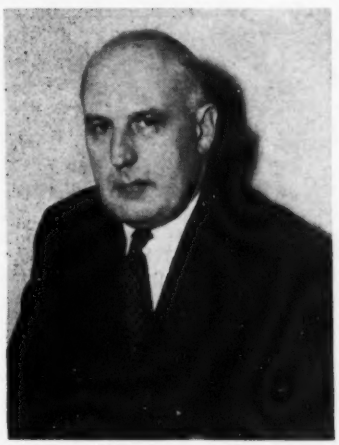
Chemicals and allied products showed high quarterly profits per dollar of sales for the first quarter 1947, in a new report by the Federal Trade Commission covering 21 major industry groups.

The industry and related manufacturers had quarterly profits before Federal taxes of 17.6 cents per dollar of sales, ranking with textile mill products, and second only to lumber and wood products. Profits after taxes amounted to 10.8 cents, compared with 10.5 for textile mill products.

Chemicals and related products had a quarterly ratio to stockholders' equity of 8.2 per cent before Federal taxes, and 5 per cent after taxes, compared to the textile mills' top of 11 and 6.6 per cent respectively.

The Federal Trade Commission report is a new series, based on data gathered jointly with the Securities and Exchange Commission. The latter covers registered corporations, and FTC reports on non-registered companies. The reports will be based on quarterly data from a sample of 5,468 companies having total assets of $40 billions.

Koppers Appoints van der Hoeven



B. J. C. van der Hoeven, made assistant general manager of the Chemical Division, Koppers Co. He has been chief of the company's chemical engineering department.

Special Committee Appraises Texas Plants

The subcommittee of the House Armed Service Committee has completed an inspection tour of rubber and chemical plants along the Texas Gulf Coast to gain information necessary for recommending legislation governing these vital plants. The committee reports that it is going to see that the rubber industry in Texas is continued. Among the group were Reps. Paul W. Shafer and Fred Crawford, Michigan Republican, and Lyndon Johnson, Texas Democrat.

Included in the tour were visits to the rebuilding Monsanto Chemical Company's styrene plant at Texas City, and the Dow Chemical Company's styrene plant at Velasco.

Plan Future Chemical Expositions

In view of the success of the Pacific Chemical Exposition, a second Exposition has been scheduled for 1949. It will be held at the San Francisco Civic Auditorium on Nov. 1-5, 1949. A special effort will be made to increase attendance from overseas.

Also reported to be under consideration: an exposition to be held at Houston, Texas.

Imported Poisons Must Be Registered

Insecticides and other economic poisons imported into the United States must first be registered with the Department of Agriculture — the same as economic poisons of domestic manufacture.

Other provisions relating to imported economic poisons and devices are essentially the same under proposed regulations as under the Insecticide Act of 1910.

Seek New Cottonseed Data

New and improved uses and thus wider markets for cottonseed and other cotton by-products is the aim of research just approved under the Research and Marketing Act of 1946. The work will be conducted by the Bureau of Agriculture and Industrial Chemistry at its Southern Regional Research Laboratory, New Orleans, La., and at various cottonseed processing mills in the southern States.

The over-all objective will be sought through six specific lines of research which, briefly, are as follows: (1) A determination of the influence of environment and variety of cotton on the composition of cottonseed; (2) development of commercial-scale methods or processes for the fractionation of cottonseed kernels into oil, meal, and pigment glands; (3) study aimed at finding wider industrial uses for cottonseed pigment glands; (4) investigation of the nutritional value of cottonseed by-products that are produced by new fractionation methods; (5) large-scale tests of processing cottonseed oil that has been produced by new methods of fractionation; and (6) work on practical methods for producing and utilizing cottonseed protein fiber from the purified meal that results from the new fractionation process.

Burruss to Direct Glidden Engineering

David N. Burruss, Jr., named director of engineering for The Glidden Co. His headquarters will be in the Union Commerce Building, Cleveland, Ohio.

Chemical Company Nine Months Earnings

	NET INCOME AFTER TAXES
Atlas Powder Co.	$1,472,841
Freeport Sulphur Co.	2,180,648
Hercules Powder Co.	10,057,668
Monsanto Chemical Co.	12,395,367
Nopco Chemical Co.	410,543
Phillips Petroleum Co. and subsidiaries	25,706,156
Sterling Drug Inc. and subsidiaries	10,313,693
Union Carbide and Carbon Corp. and subsidiaries	54,865,182

Extend Time for Plant Bids

Bids on the Paraxol and Dynamit A. G. factories in Germany may be submitted until January 9, 1948, according to Major General Donald H. Connolly, Foreign Liquidation Commissioner. These two chemical facilities, allocated as reparations, were offered for sale to U. S. industries, independently of each other, on October 2, 1947. Originally bids were asked for on both chemical plants by December 10, 1947.

These plants include units for the production of formaldehyde, pentarythritol, and plastics and are known as reparations plants number 104 and 1022, located respectively at Lippoldsberg and Geestacht-Krummel, Germany.

Jebens Joins Patterson Foundry

Raymond H. Jebens, new chief chemical engineer for the Patterson Foundry & Machine Co. He was formerly associated with the Du-Pont Co.

British-American Concern Boosts Plastics Output

A reorganization of the plastics production program, charted by Goodrich Rubber Co. and Distillers Co. Ltd., was effected recently.

Manufacturing operations of this British company will be centralized at Barry, South Wales. In addition, new facilities for two subsidiaries, British Resin Products Ltd. and British Geon Ltd. are being built.

The cost of these expansions will approximate 2 million pounds.

CALENDAR *of* EVENTS

AMERICAN ASSOCIATION FOR ADVANCEMENT OF SCIENCE, annual meeting, Chicago, Dec. 26-31.
AMERICAN CHEMICAL SOCIETY, jointly with S. C. I. in charge Perkin Medal, Jan. 9.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Pittsburgh, Pa., Jan. 26-30.
AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION, jointly with Canadian Pharmaceutical Manufacturers' Association, midyear meeting, Waldorf-Astoria, New York, Dec. 15-17.
ASSOCIATION OF AMERICAN SOAP AND GLYCERINE PRODUCERS, Waldorf-Astoria, New York, Jan. 28-29.
COMPRESSED GAS MANUFACTURERS' ASSOCIATION, INC., 35th annual meeting, Waldorf-Astoria, New York, Jan. 26-27.
NATIONAL ASSOCIATION OF CORROSION ENGINEERS, fourth annual conference and exhibition, Jefferson Hotel, St. Louis, April 5-8.
NATIONAL PETROLEUM ASSOCIATION, Cleveland Hotel, Cleveland, April 21-23.

Investigate Nicotine Extraction Techniques

The shortage of nicotine, an extremely important pesticide, during the past several years and the probable continuance of this shortage has caused the U. S. Department of Agriculture to undertake a long-time project to recover nicotine from Nicotiana rustica—a wild tobacco plant.

Laboratory research during the past year on the extraction of nicotine was encouraging. Hence, it was decided to evaluate the results on a pilot plant or semi-commercial scale.

The program calls for research on the recovery of nicotine from green tobacco plants, as well as from dried material. This is a new approach to the problem since most of the nicotine that is produced today is obtained from the dry tobacco.

Schnabel Heads Celanese Service

William H. Schnabel, director of the technical service department of Celanese Chemical Corp. He was previously superintendent of the acetic acid unit at Bishop, Texas.

COMPANIES

ESTABLISSEMENTS KUHLMANN, Paris, France, now has an American subsidiary, American Industrial Development Corp., with offices at 445 Park Ave., N. Y. J. G. Devys is president.

MONSANTO CHEMICAL CO.'s Plastics Division has started construction of a new unit to produce formaldehyde at Springfield. It is expected that this will be completed in the second quarter of 1948.

ARMOUR AND CO. has purchased a 54 acre site north of Aurora, Ill., on which it will construct a series of one story buildings to be used as pharmaceutical laboratories.

CITIES SERVICE CO. has formed a new company, CITIES SERVICE RESEARCH AND DEVELOPMENT CORP., which will be charged with direction of all the research activities which have been carried on by individual companies of Cities Service. Among major development projects, the corporation will do research in the synthesis of liquid petroleum products from natural gas in cooperation with the M. W. Kellogg Co., and on the development of chemicals from natural gas.

COMMERCIAL SOLVENTS CORP. has absorbed the activities of its division, the Pennsylvania Alcohol & Chemical Co. The offices formerly occupied by Pennsylvania Alcohol, at 745 Fifth Ave., N. Y.,

WH&C Chemical Specialties

ANIMAL FATS
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GUM KARAYA (Indian)
GUM TRAGACANTH
GUM EGYPTIAN
GUM LOCUST (Carob Flour)
QUINCE SEED

★

CASEIN

SPECIALTIES:

MENTHOL (Crystals)
★
TARTARIC ACID
★
CREAM OF TARTAR
★
EGG ALBUMEN
EGG YOLK
BLOOD ALBUMEN
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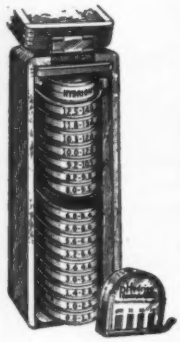
19

Hydrion pH Papers In One Compact Case



This new variety of sensitive pH papers offers a sharp color change within 0.25 pH unit of almost any point of interest from pH *0* to pH *14*.

Hydrion test papers are so simple, so accurate, now so nearly universal, that this Set H-20 *should be in the hands of every worker making pH measurements in laboratory or plant.*

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The Crocker-Henderson Odor Classification Set makes possible the numerical specification of odors in raw materials and finished products. Any odor specification can be reduced to a 4-figure number.

Developed in the Laboratories of Arthur D. Little, Inc.

Write for Booklet C-O which explains this system of Odor Analysis

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have become those of the New York district sales office of Commercial Solvents.

INTERNATIONAL MINERALS & CHEMICALS CORP. has completed negotiations with the Prudential Insurance Co. of America for a $12 million loan. A portion of the proceeds will be used to retire a current term bank loan of $6,625,000 and approximately 2 million dollars added to the working capital of the corporation. The balance will be reserved for plant expansion.

The CONTINENTAL CAN Co. has let a contract for the construction of a 240,000 sq. ft. factory building in Portland. Construction of the new plant, to cost in excess of $1 million, will be started immediately.

GENERAL CHEMICAL Co. has been merged with its parent company, ALLIED CHEMICAL & DYE CORP., and its business will be conducted under the name of General Chemical Division, Allied Chemical & Dye Corp.

COIGNET CHEMICAL Co. has received the exclusive right to import and distribute in the United States the glues, gelatines, and other products manufactured by Societe des Produits Chimiques Coignet, Paris, and its Belgian division, Gelatines Hasselt & Vilvorde, Brussels.

GULF OIL CORP. has made plans for improvements to the Ohio refinery facilities at Cincinnati and Toledo, to cost in excess of $20 million. The program calls for large new catalytic cracking units at both Cincinnati and Toledo, will equip both refineries to produce higher octane gasolines and other petroleum products of improved quality.

The AMERICAN FIRSTOLINE CORP., manufacturer of industrial chemicals, pigments and solvents, has started large scale manufacturing of zinc carbonate, 25 and 36 per cent zinc sulphate, and solutions of zinc chloride.

A Road-Test Laboratory, to evaluate petroleum chemicals in motor fuels, is being established by the DU PONT Co. at El Monte, California. Iver Theodore Rosenlund, research engineer, has been named laboratory manager.

G. S. ZIEGLER & Co. is expanding its business in the field of compounding ingredients for natural and synthetic rubbers featuring activation acids, detacifiers and other processing aids, especially cure-activated plasticizers.

AMERICAN MINERAL SPIRITS Co., Western, of Los Angeles, has opened its San Francisco, California, office under the management of James W. Guthrie of the J. W. Guthrie Co., San Francisco. American Mineral Spirits will have storage for its products at Richmond, California, for local distribution in the Bay Area.

New plant facilities to increase production at the SWAN RUBBER Co. at Bucyrus, Ohio, have been completed by THE H. K. FERGUSON Co.

GODFREY L. CABOT, INC., has appointed the MORTON-MYERS Co. as its representative for the distribution of color and ink grades of Cabot carbon black in the area served from Kansas City, Mo. The territory which Morton-Myers will cover is made up of Missouri, excluding metropolitan St. Louis, Kansas, Iowa, Nebraska and Oklahoma.

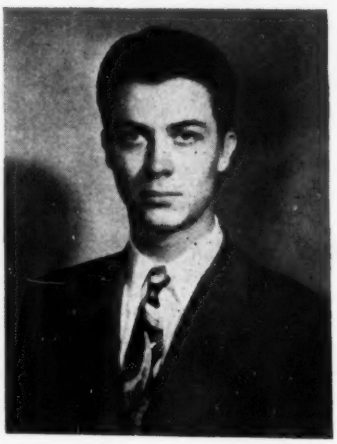
The SHERWIN-WILLIAMS Co. of California has put into operation a new synthetic resin manufacturing unit at its Emeryville, California, plant. Production from the facility will be used primarily by S-W's paint, varnish and lacquer plants at Oakland and Los Angeles.

A long-term contract announced jointly by PHILLIPS PETROLEUM Co. and THE ATLANTIC REFINING Co. provides for the construction of a modern propane plant in the Philadelphia area and marketing of its production in tank car and tank truck quantities. The new plant will be an addition to Atlantic's present Philadelphia refinery.

The PENNSYLVANIA SALT MANUFACTURING Co. has installed at the Wyandotte plant a unit for the manufacture of monochlorobenzene, a basic material used in the manufacture of DDT.

Construction of a new ANSCO film plant costing $2 million will be started shortly at Binghamton, N. Y. It is expected that the building will be erected by next summer.

Woburn Names Williams



C. E. Williams, appointed assistant sales manager, Woburn Chemical Corp. He joined Woburn upon his release from the U. S. Army Air Corps.

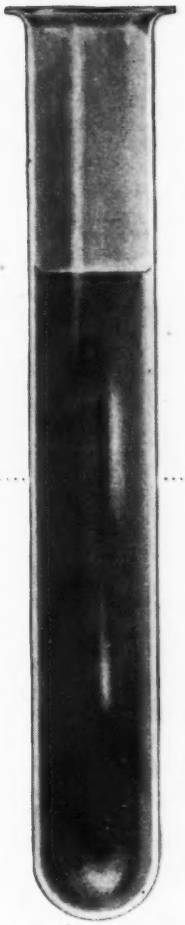
SHARPE & DOHME, INC., has concluded arrangements with the Penn Mutual Life Insurance Co. and the New York Life Insurance Co. for an $8 million loan. Purpose of the financing is in part to repay temporary bank loans incurred in connection with the recent purchase of the former SKF war plant near North Wales, Pennsylvania. It also will provide funds for additional buildings and facilities.

INTERNATIONAL MINERALS & CHEMICALS CORP. expects to begin construction shortly of a plant in Somerset, Kentucky, designed to produce from 12 to 15 thousand tons of mixed fertilizers annually.

Plans have been completed by the operators in the Burnell-North Pettus Field for the construction and operation of a cycling plant to be located in Bee County, Texas. The cycling plant will be operated by STANOLIND OIL AND GAS Co.

KOPPERS

coal-tar chemicals



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TAR ACID OILS
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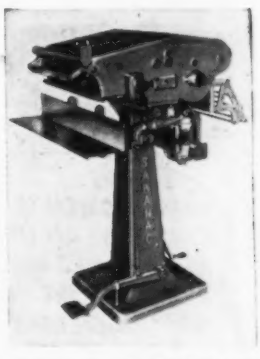
Bulletin 154-C67 contains detailed information about bag sealing machines and about our inexpensive licensing plan.



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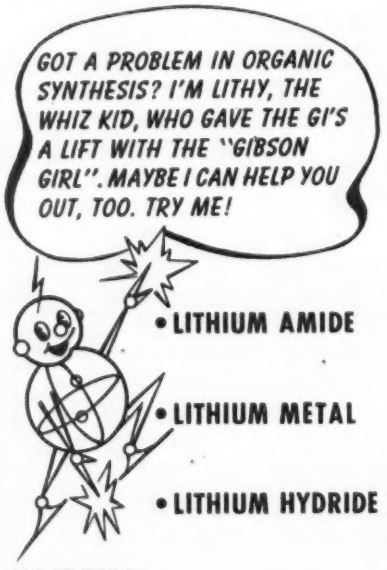
She needed a 300-foot antenna—that's where LITHIUM came in. When exposed to water, Lithium Hydride inflated an attached balloon with hydrogen. The balloon lifted the antenna ... and a turn of the "Gibson Girl" crank sent out the S.O.S.


GOT A PROBLEM IN ORGANIC SYNTHESIS? I'M LITHY, THE WHIZ KID, WHO GAVE THE GI'S A LIFT WITH THE "GIBSON GIRL". MAYBE I CAN HELP YOU OUT, TOO. TRY ME!
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DIVISION LITHIUM CORPORATION OF AMERICA, INC.
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AMECCO CHEMICALS, INC. has closed its sales offices in New York City and transferred offices and manufacturing plant to Henderson, Nevada. Amecco has disposed of its plant at Rochester, N. Y. and has acquired the B.M.I. plant of the Hardesty Chemical Co., Inc., at Henderson and will manufacture synthetic detergents, chlorinated organics and synthetic organic chemicals.

Culp to Manage Pittsburgh Sales

W. Ray Culp, appointed manager of industrial sales, Pacific Coast, for the paint division, Pittsburgh Plate Glass Co. He has been associated with Pittsburgh Plate for 27 years.

A new division, The Plastic Materials Sales division, has been established by THE B. F. GOODRICH Co. and L. H. Chenoweth named general manager. The division will handle sales of all the company's plastic materials including Koroseal.

THOMPSON-HAYWARD CHEMICAL Co., Kansas City has purchased two warehouses, located at Chicago and Minneapolis, and started construction activities on another at Wichita, Kansas.

The new Chicago warehouse replaces the facilities that were destroyed by fire in February.

CANADA

English Company Forms Canadian Subsidiary

The Epheta Manufacturing Co., subsidiary of the London, Eng., company of the same name, has recently formed a Canadian subsidiary at Chatham, Ont.

The firm will manufacture chemical scale removers, and water treating specialties as initial products. According to Managing Director Sidney List, several other chemical lines will be added within the next year.

Standard Seeks Additional Finances

An additional issue of $2 million of preferred shares was offered recently by Standard Chemical Co., Ltd., major Canadian manufacturer of wood-derived chemicals. Proceeds are to be used in part to retire a $1.2 million bank loan with the remainder to be used for general corporate purposes.

Among the projects under consideration: purchase of the buildings occupied during the war by Canadian Aircraft & Instrument Co., Leaside, Toronto. If these facilities are acquired they will be used for the manufacture of laundry specialties (by the subsidiary, Dalglish Chemicals, Ltd.) and for the consolidation of Toronto warehousing.

Company Notes

CANADIAN DUREX ABRASIVES Co., Brantford, Ont., plans construction of a $500,000 plant expansion. An additional $500,000 will be invested in new equipment.

J. C. ENO (CANADA), LTD., a part of the Beecham group, London, Eng., has extended its manufacturing facilities, is contemplating marketing several new pharmaceutical products.

GREAT LAKES PAPER Co., Fort William, is considering construction of a $10-$12 million kraft paper mill.

ST. REGIS PAPER Co. (Canada) has completed a new $450,000 multiwall paper bag plant at Vancouver, B. C.

IMPERIAL OIL Co. is drafting plans for a $3-$4 million lube oil unit to be located at Edmonton, Alta.

HARRISONS & CROSFIELD (CANADA), LTD., has been appointed Canadian agent for G. S. Ziegler & Co. The latter concern compounds and re-runs fatty acid pitches for use in paints, printing inks, floor covering, etc.

PERSONNEL

Officers

● LLOYD VAN DOREN, chemical consultant and registered patent agent, is now located at 30 East 40th Street, New York, N. Y.

● RICHARD CARROLL has been promoted to divisional vice-president, Winthrop-Stearns, Inc. He will continue his duties as superintendent of manufacturing operations at the firm's Rensselaer, N. Y., plant.

● J. T. CLAIBORNE, JR., formerly vice-president of Freeport Sulphur Co., has become a general partner in the firm of J. H. Whitney and Co. J. H. Whitney and Company is a private firm engaged in the investment of venture capital.

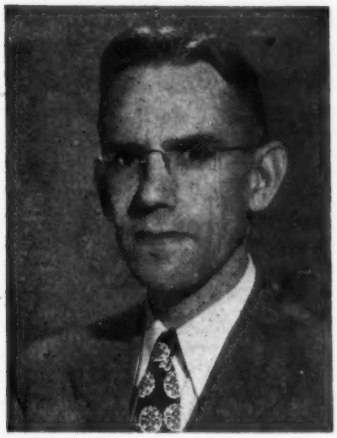
● FREDERIC W. MELLOR has joined The Foundation Co., New York, as assistant to the president. He recently resigned as general sales manager of The H. K. Ferguson Co.

● GEORGE BARNES, formerly executive vice-president and general manager of

O-Cedar Corp'n, Chicago, has been elected president.

● C. M. SUTER, identified with the research activities of Sterling Drug, Inc., since 1942, has been elected divisional vice-president of the Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Westvaco Names Thomas



Joseph S. Thomas, chosen technical personnel manager for Westvaco Chlorine Products Corp. He will join the Industrial Relations Dept. in New York.

Production

● ROBERT K. PRINCE has been named manager of the wood processing machinery section, Allis-Chalmers basic industries department. He joined Allis-Chalmers in 1943.

● MILTON WELHOELTER has been appointed assistant manager of the design section, Monsanto Chemical Co.'s general engineering department. He was first employed by Monsanto in 1936 as a design engineer at the John F. Queeny plant in St. Louis.

Research

● ROBERT THOMAS has joined the rereach laboratory staff of Michigan Chemical Corp., in charge of organic research. He was formerly with the Firestone research laboratories at Akron.

● KENNETH E. GLIDDEN, formerly of the Brown Co., Berlin, N. H., has been appointed research associate of the Institute of Paper Chemistry, and will be group leader of the Pulp and Paper Technology Section.

● Food Research Laboratories, Inc., Long Island City, N. Y., has promoted MILTON BLITZ to the position of assistant to the chief chemist.

● ALEX G. OBLAD and JACK C. DART have been named director of chemical research and director of development, Houdry Laboratories. They will make their headquarters at the Houdry Laboratories near Marcus Hook, Pennsylvania.

● Recent additions to the staff of Southern Research Institute include the following: MARY EIDSON and ANN OLANDER, chemical research, and JUANITA BEDINGFIELD, biology.

● VICTOR E. AMSPACHER has been made chief chemist, in charge of the Chemical Laboratory, Pennsylvania Railroad Test Department, Altoona, Pa.

Sales

● C. GEORGE TAYLOR has been promoted to the position of assistant sales manager in charge of the export division, Woburn Chemical Corp. He joined Woburn in 1938.

● BEN S. GARVEY, JR., formerly of B. F. Goodrich Co., is head of the new Rubber Sales Service Laboratory recently established by Sharples Chemicals, Inc.

● The Du Pont Co. has appointed E. HEARN SIMPSON to the newly created position of assistant sales manager of petroleum additives, and BARRY V. CORNWALL to succeed him as sales manager for the alcohol and camphor section.

● WILLIAM L. PLATT has been made Boston district sales manager for the Columbia Chemical Division, Pittsburgh Plate Glass Co.

● NOLAN B. SOMMER has recently joined the sales department of Jefferson Chemical Co., Inc., as market development representative. He was previously a research chemist in the Stamford laboratories of the American Cyanamid Co.

● ERNEST HOOKWAY has been appointed operating manager of the recently created plastic materials sales division, The B. F. Goodrich Co. He has been with the company since 1936.

● ARTHUR R. DUNN has been appointed foreign sales manager of The Ames Co., Inc., Elkhart, Indiana, pharmaceutical manufacturer, and Chemical Specialties Inc., Zeeland, Michigan, manufacturer of fine chemicals.

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★ Chicago

★ Los Angeles

Chemical Division

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CHEMICAL SPECIALTIES

A department devoted to news of the chemical specialties field. Descriptions of new specialty products will be found in the New Products & Processes department.

Probe Evaluation of Detergents

To date no instrument, method, or soil has been accepted as a standard for detergency evaluation. Too, although there has been a good deal of work carried through on instrumentation and methods, but little attention has been paid to the selection of a standard soil.

Based on experiments with a soil composed of Oildag, 2 per cent; Alkanol WXN, 0.25 per cent; 3F Fibre Spray Oil, 8.0 per cent; and Stoddard Solvent, 89.75 per cent, researchers presented the following observations before a recent meeting of the American Association of Textile Chemists and Colorists:

1. Higher temperature does not necessarily mean greater soil removal. Thus it is essential that any detergent must be evaluated at the temperature at which it will be used in plant practice.

2. The type of soil, sample area, length of wash, and type of fabric all have a pronounced effect on "detergency" results. Here again, plant conditions must be considered in formulating test procedures.

Investigate Novel Gum

The preparation of tamarind seed pectin and the reaction of borax with it to yield "gum taminda" was described in a recent edition of the Indian Textile Journal (66, p. 506).

The gum, developed during the period of wartime shortages, has been used successfully in cotton mills as a substitute for carob bean and tragacanth gums.

Plough Pushes Foreign Trade

Plough, Inc., Memphis, Tenn., manufacturer of pharmaceutical and household specialties, is planning the establishment of manufacturing plants in Guatemala and Palestine. At present the concern has units in Mexico, Venezuela, Colombia and Peru.

From 1938 to 1946 the company's total sales and earnings have doubled. Total output last year: 104 million packages.

Plough's main products include: aspirin, milk of magnesia, cod liver oil, cold remedies, Mufti's dry cleaner, lighter fluid and shoe white.

Du Pont Forms Retail Division

The Grasselli Chemicals Department of the Du Pont Company has created a Retail Products Division, which will be responsible for the company's interest in seed disinfectants and garden products.

Joseph A. Jenemann, formerly manager of sales development of the Grasselli Department, is manager of the new division. He has as his assistants Leo. L. Stirland, who will continue in charge of the sale of seed disinfectants, and James H. Dunbar, in charge of sales of garden products.

Forms New Company

H. R. Shepard, vice-president of the newly organized Connecticut Chemical Research Corp., Bridgeport. The firm will serve as a private brand packer and contract filler of low-pressure aerosols.

Market Multipurpose Adhesive

A new adhesive, tradenamed P. C. Multi-weld, has been introduced recently by Paper Chemicals, Inc., New York. It is claimed to act as a satisfactory bond between a wide variety of materials, including paper to paper, wax to wax, glass to metal, metal to metal, etc.

It is marketed as a water-white, rapidly-drying compound, and is said to retain its flexibility and to resist oxidation.

Subject Insecticides to Research Scrutiny

Because several highly effective insecticides developed during recent years are known to be toxic to man, animals, and plants, research aimed at finding tolerance levels of the more promising of these new materials to various animals has been approved under the Research and Marketing Act of 1946, the U. S. Department of Agriculture reports.

The work will include studies to determine the acute and chronic effects of external applications of various insecticides to several kinds of farm animals and the amount of DDT and other insecticides stored in animal tissues or lodged in animal products as a result of external applications to control various livestock pests. An effort will also be made to determine the effect that alfalfa and other forage crops sprayed with DDT and other materials may have on the growth and health of dairy cattle fed such crops.

Push Development of Fire Retardant Paints

Wood, paints, cotton fabrics and other organic materials cannot be made completely fireproof, but they can be rendered flame-resistant by appropriate chemical treatment so that they will prevent small fires or the spreading of fires already established, Leon S. Birnbaum of the Industrial Test Laboratory of the Philadelphia Naval Shipyard reported recently.

Describing a new fire-resistant paint developed by the Navy, Mr. Birnbaum says that such paint does not flash or burn at high temperature, but that it does not render fireproof articles on which it is used as a coating. If articles are flame-resistant, however, they will actually stop burning or glowing when heat or fire from other sources is removed.

The new paint used by the Navy has a high pigment content, excellent hiding power to permit the application of thin coats, and uses antimony oxide as the fire retarding agent. However, it has poor resistance to staining, poor washability, and gives inferior protection against rusting in locations of extreme humidity.

Work is now under way to improve the paint's overall performance without sacrifice of fire-retardance.

Johnson Begins New Laboratories

S. C. Johnson & Son, Inc., Racine, Wis., has broken ground for a 15-story research laboratory of futuristic design.

The tower, designed by Frank Lloyd Wright, is 40 feet square and 156 feet high. It will be constructed of brick, glass and reinforced concrete.

The new unit will house Johnson's wax research, development, and control laboratories. Surrounding the building will be several two- and three-story units which will include technical service, photographic and library facilities.

U. S. Rubber Cultivates Carpet Trade

Development of a new adhesive described as "first aid for carpets" has been completed by United States Rubber Co.

The specialty speeds joining and edge-binding carpets and repairing damaged portions, according to John P. Coe, vice-president and general manager of the company's Naugatuck Chemical Division.

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R. T. VANDERBILT CO., INC.
Specialties Department
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It is a self-curing, liquid, white rubber compound called Rug-Sealz.

It is said to be strong enough to butt-join sections of carpet padding without reinforcement. The material also anti-skids carpets when painted over the entire backing, is odorless and resistant to copper in wool dyes used in carpets.

The rubber company is now supplying Rug-Sealz to about 60 carpet and rug distributors and accessory houses.

Market Novel Hand Cleaner

A new type of powdered skin cleaner, tradenamed Steropac, is now being manufactured by the Skotch Products Corp., Detroit.

The compound, which has a pH of 6.5—approximately that of human skin—is claimed to be non-irritating and an efficacious cleaner. One constituent: a quaternary ammonium emollient.

Polish for Chrome Plate

Properly prepared silver polishes are also frequently used on chromium and nickel-plated surfaces. However, there are products especially made for these metals, as indicated in the following polish for chrome plate:

Amorphous silica	3.0 parts
Kieselguhr or "soft tripoli"	9.0 parts
Oleic acid	8.0 parts
Ammonia (0.880)	2.0 parts
Glycerine	10.0 parts
Hard soap powder	2.0 parts
Water	66.0 parts

Sharp & Dohme Elects

Stuart T. Henshall, elected comptroller for Sharp & Dohme. He has been with the company's accounting department since 1930.

Eagle Picher Acquires Subsidiary

Eagle Picher Co. has purchased a controlling interest in the Alston-Lucas Paint Co., Lyons, Ill., according to J. M. Bowlby, Eagle Picher president.

Alston-Lucas makes a complete line of exterior and interior paints, enamels, varnishes and industrial finishes and has plants at Lyons and Oklahoma City. A contract has just been let for erection of a third plant in Atlanta, Ga. Distribution is presently concentrated in mid-western and southern states.

Introduce Plastic-Based Anti-Skid Compound

A plastic compound guaranteed to make rugs skid-proof with one application has been developed by the Chemo-Plastics Co., Inc., Hempstead, N. Y.

Called Rug-Seez, it is packed in retail size cans.

The specialty may be applied to the backs of axminister, chenille, velvet, wilton, wool, cotton fibre or other types of novelty rugs. It will not mar the floor and ordinary laundering will not affect the binding qualities of the compound

Bee Promotes Grinding Coolant

The Bee Chemical Co., Chicago, Illinois, has developed a grinding coolant which has been named Wheelyfe 85.

It is a clear solution which will not load the wheel even with the finest grit sizes. Because of freedom from loading, the finish is determined by the grit size used and is not the mirror finish obtained by the buffing action of a loaded wheel.

This coolant is claimed to sink chips well, give proper corrosion protection, and will not become rancid.

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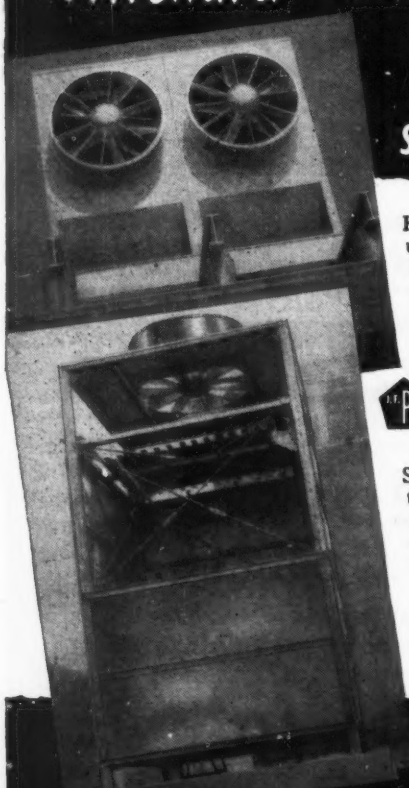

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CHEMICAL MARKETS

More Rosin in Prospect

Even though bad weather had plagued producers, current indications are that output of both gum and wood rosin will be sufficient to accommodate both domestic and exports needs. Actually, it is estimated that production of both types of rosin will approximate 2,075,000 drums, whereas total demand is placed at about 2,000,000 drums.

Of this total, domestic consumers will account for some 1,400,000 drums; export markets may—despite the dollar shortage—absorb 500,000 drums. Such overseas sales, incidentally, are about 15 per cent above 1946 shipments.

The prospects for the remainder of the crop year are also fairly encouraging. New units, either now operating or soon to come in, should add about 200,000 drums of wood rosin to U. S. output. Hence it is anticipated that wood processors will turn out about 1,400,000 drums, with gum rosin makers accounting for an additional 875,000 drums.

One development naval stores men expect to continue: a steady, and long-term increase in foreign rosin needs.

Paintmakers' Raw Materials To Ease

The paint industry, long bedeviled by raw material shortages, is now heading into smoother waters. Most paint components will be in easier supply next year, and many manufacturing headaches will evaporate. But how about paint sales? Will they hold up, or are they destined to ebb?

On the raw material front paintmakers can count on:

1. More titanium pigments, ketones, butyl alcohol and possibly alkyd resins.
2. A gradual, but not early, improvement in lead pigments.
3. Ample quantities of rosin and linseed oil.
4. A slight easing of ethyl and butyl acetates in 1948, a substantial bettering of the situation in 1949.

There is only one matter which does cause the industry some concern. What about government stockpiling? Reports current in the trade indicate the federal authorities have bought large quantities of tung oil, for instance, and may expand its stockpiling of other paint-essential commodities. This fear is not justified, however, for according to government offifficials only materials which are produced abroad, and in which the U. S. is not self-sufficient, will be covered by their purchasing program. Thus, any such governmental activities are not expected to encroach upon rosin, pigments or solvents supplies.

The industry's sales prospects are, however, difficult to foresee. There is no gainsaying that the 600,000 new housing units scheduled to be built offer a lush market for paints. Furthermore, at least 16,000,000 U. S. homes are in need of major repairs. Those facts would, by themselves, suggest that a market for the industry's output for the next ten years stands waiting. But that is not quite true.

Labor costs are mounting in the construction industries. Many housing units are now priced beyond the reach of the mass market. If they continue to rise, construction may be curetailed, repairs deferred. And, this, more than any other single factor worries paint producers.

The industry is virtually assured that it will enjoy a $1 billion volume this year. Next year, too, it should hold up well. And, if labor costs do not mount to extraordinary heights, several years of good, but highly competitive business, appears in the offing.

Carbon Black Reserves Increase

Producers' stocks of furnace black continued their substantial rise during September while production and shipments dropped from the August levels.

Exports of both contact and furnace types carbon black ebbed sharply from the all-time peak of 40,478,000 pounds established in August. September exports of 32,470,000 pounds, however, still exceeded the July level of 28,553,000 pounds.

September production of carbon black amounted to 112,199,000 pounds, down slightly from the 113,680,000 pounds produced in August. The decline in furnace types was slightly greater than in contact types. Shipments of carbon black dropped almost 3,500,000 pounds from August, with a slight increase in contact types failing to offset a drop of nearly 4,000,000 in shipments of furnace types.

Sulfur Tonnage Tops Last Year

For the third consecutive month output of native sulfur surpassed the previous month's production and established a new record. Production and sales were both approximately 4 per cent higher than in August and output through September, 1947, was 14 per cent greater than in January-September, 1946.

Period	*Production*
August 1947	391,396
September 1947	406,964
September 1946	335,300
January-September 1947	3,211,383
January-September 1946	3,820,394

Chemical Workers Wages Rise

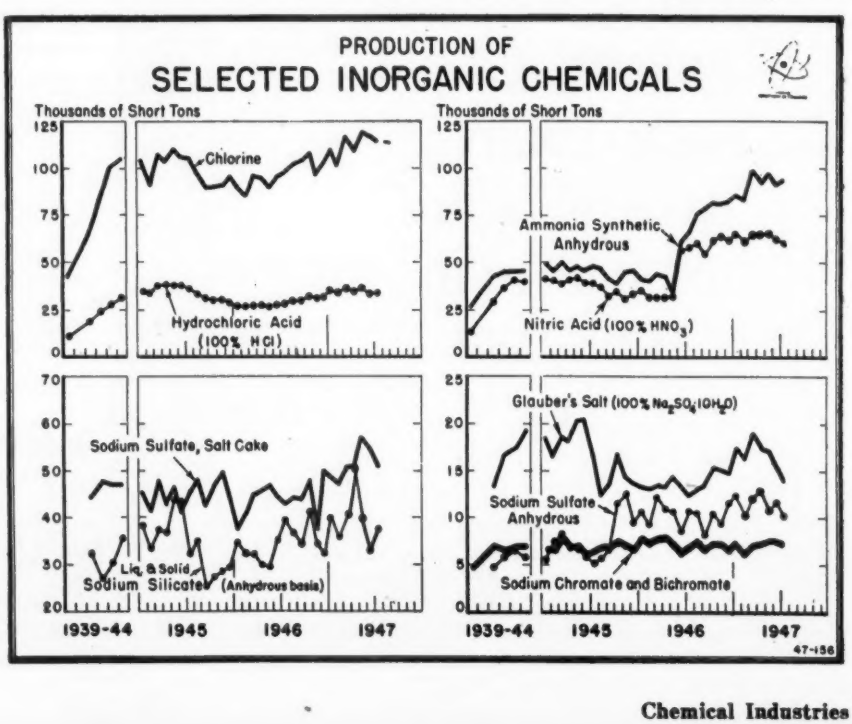
Weekly earnings of workers in chemical and related fields showed a slight increase in August, as compared with July. A breakdown of the weekly earnings follows:

	Weekly	
	August, 1947	*July, 1947*
Chemical and allied products	$51.31	$50.97
Ammunition	49.77	50.42
Chemicals	57.44	57.73
Cottonseed oil	35.77	35.38
Drugs, medicines, insecticides	45.68	43.50
Explosives, safety fuses	57.08	56.47
Fertilizers	37.17	37.04
Paints and varnishes	53.76	53.37
Petroleum refining	63.12	64.12
Rayon, allied products	49.04	48.69
Soaps	59.01	56.28

Casein Production at High

September dry casein production was the highest since 1941 and manufacturers' stocks at the end of the month were the lowest on record.

Production of dry casein was estimated



at 2,530,000 pounds for September, a gain of 120 per cent from a year earlier and 53 per cent from the 1941-45 average for September.

For 1947 through September, production totaled 27,833,000 pounds, a gain of 108 per cent from the corresponding period of 1946 and 16 per cent from the 5-year average production for the same months.

Total stocks of casein held by driers on Sept. 30 were estimated at 2,550,000 pounds, a decline of 47 per cent from a year earlier.

Glue Output Gains

Production of glue totaled 12,003,464 pounds during the month of September, more than 3,000,000 pounds above the September, 1946, figure and approximately 600,000 pounds greater than the August, 1947, total, the Bureau of Census reported.

A total of 6,947,981 lbs. of bone glue were produced during the month while hide glue output amounted to 5,055,483 lbs.

Glue shipments totaled 11,697,113 lbs. during the month, nearly 1,000,000 lbs. below the August figure but well above the 9,130,684 lbs. for September, 1946.

Zinc Holds Steady

Mine output of zinc in the United States in September was virtually unchanged from August, indicating a slight gain in the daily rate of output, according to the Bureau of Mines.

The average monthly output in the July-September quarter, however, was 18 per cent below that in the second quarter of the year.

Potash Deliveries Up

North American potash deliveries by the five major American potash producers continued at a high level during the second quarter of 1947, totaling 474,656 tons of potash salts containng an equivalent of 259,595 tons of K_2O. This included French imports into the United States but not into Canada. It represented an increase of 22% in salts and 18% in K_2O over the tonnage delivered during the corresponding period in 1946.

Deliveries for agricultural purposes in the United States, Canada, Cuba, Hawaii, and Puerto Rico (Institute countries) amounted to 441,092 tons of salts equivalent to 238,678 tons of K_2O, consisting of 211,890 tons as muriate, 8,756 tons as manure salts, and 18,032 tons as sulphate of potash and sulphate of potash-magnesia. Deliveries for chemical purposes amounted to 31,338 tons of salts, equivalent to 19,553 tons of K_2O. Exports to other than Institute countries totaled 1,364 tons K_2O, about the same as last year.

During the first six months of 1947, total North American deliveries, including imports amounted to 993,410 tons.

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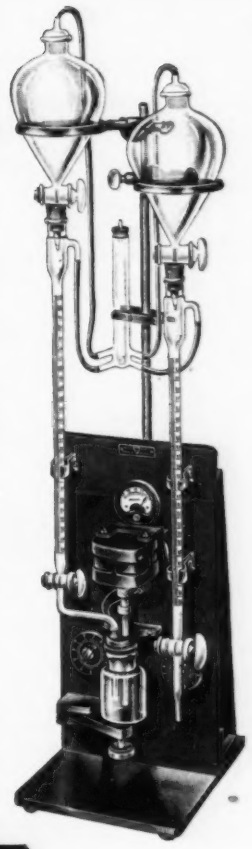

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Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
November, 1945, $0.864 November, 1946, $0.767
November, 1947, $0.601

	Current		1947		1946	
	Low	High	Low	High	Low	High
Acetaldehyde, 99%, drs wks..lb.	.11	.12	.11	.15	.11	.14
Acetic Anhydride, drs.....lb.	.13	14½	.11½	.14½	.11½	.13
Acetone, tks, delv.....lb.	.07	.09	.07	.10	.06	.07
ACIDS						
Acetic, 28% bbls.....100 lbs.	3.78	4.08	3.38	4.08	3.38	3.63
Glacial bbls..t.....100 lbs.	10.65	10.90	9.15	10.90	9.15	9.40
drs, wks.....t....100 lbs.	13.20	14.00	6.93	14.00	6.93	7.25
Acetylsalicylic, Standard USP.....lb.	.45	.59	.45	.59	.40	.59
Benzoic, tech, bbls.....lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up...lb.	....	.54	....	.54	....	.54
Boric tech, bbls, c-l.....tons *a*	....	137.50	....	137.50	....	109.00
Chlorosulfonfc, drs, wks.....lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.....lb. *b*	.22	.23	.20	.23	.20	.21
Cresylic 50%, 210-215° HB, drs, wks, frt, equal.....gal.	....	1.26	1.01	1.26	.81	1.04
Formic, 85%-90% cbys.....lb.	.12	.14½	.10	.14½	.10	.13
Hydrofluoric, 30% rubber, drs.....lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls, wks..lb.	.44	.48	.039	.0415	.039	.0415
44%, light, bbls, wks.....lb.	.815	.855	.073	.855	.073	.0755
Maleic, Anhydride, drs.....lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys.....100 lbs.	1.50	2.90	1.50	2.90	1.50	2.45
20° cbys, c-l, wks....100 lbs.	1.85	2.00	1.85	2.00	....	1.75
20° cbys, c-l, wks....100 lbs.	2.35	2.50	2.35	2.50	....	6.00
Nitric, 36°, cbys, wks..100 lbs. *c*	5.00	6.30	5.00	6.30	5.00	5.25
38°, c-l, cbys, wks...100 lbs. *c*	2.35	5.50	....	5.50	....	5.50
40°, c-l, cbys, wks...100 lbs. *c*	6.00	6.50	....	6.50	....	6.00
42°, c-l, cbys, wks...100 lbs. *c*	6.50	7.00	....	7.00	....	6.50
Oxalic, bbls, wks.....lb.	.13	.14	.11¾	.14	.11¼	.14¼
Phosphoric, 100 lb. cbys, USP.....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls.....lb.	.31	.38	.26	.42	.26	.42
Sulfuric, 60°, tks, wks.....ton	13.00	13.50	....	13.50	....	13.00
66°, tks, wks.....ton	16.50	17.50	....	17.50	....	16.50
Fuming 20% tks, wks..t..ton	19.50	20.50	....	20.50	....	19.50
Tartaric, USP, bbls.....lb.	.49½	.50	.49½	.55	.54½	.71
Alcohol, Amyl (from Pentane) tks, delv.....lb.	....	.151	....	.151	....	.13⅛
Butyl, normal, syn, tks...lb.	....	.16½	....	.16½	....	.14¼
Denatured, CD 14, c-l drs.....gal. *d*	1.03	1.04½	1.03	1.06	....	.90
Denatured, SD, No. 1, tks. *d*	....	.98	....	.98½	....	.82½
Ethyl, 190 proof tks.....gal.	18.04	18.08	18.04	18.08	....	17.94
Isobutyl, ref'd, drs.....lb.	....	.13	....	.13	....	.0860
Isopropyl ref'd, 91%, dms.....gal.	.44	.47½	.41	.50½	.38	.47
Alum, ammonia, lump, bbls, wks.....100 lbs.	....	4.25	....	4.25	....	4.25
Aluminum, 98.99%....100 lbs.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd, l.c.l. wks..lb.	....	.10¼	....	.10¼	.09	.12
Hydrate, light, bgs.....lb.	....	.17	....	.17	....	.14½
Sulfate, com'l. bgs, wks, c-l.....100 lbs.	1.15	1.30	1.15	1.30	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lbs.	1.95	2.25	1.75	2.50	1.75	2.00
Ammonia anhyd. cyl.....lb.	.16	....	.14½	.20	....	.14½
Ammonia, anhyd, fert, tank cars, wks, frt. equalized...ton	....	$9.00	....	59.00	....	59.00
Ammonium Carbonate, USP, lumps, drs.....lb.	.08¾	.14	.08¼	.14	.08¾	.09½
Chloride,whi,bbls,wks,100 lbs.	4.75	5.00	4.45	5.15	4.45	5.15
Nitrate, tech, bgs, wks....lb.	.0435	.0450	.0435	.0450	0.435	.0850
Oxalate pure, grn, bbls....lb.	.23	.29	.23	.29	....	.23
Perchlorate, kgs.....lb.	.25	....	.24	.25	no stocks	
Phosphate, dibasic tech, bgs.....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Stearate, anhyd, drs.....lb.	....	.34	....	.34	....	.34
Sulfate, drs, bulk.....ton	30.00	35.00	30.00	35.00	28.20	30.00
Amyl Acetate (from pentane) tks, delv.....lb.	.21	.24	.21	.24	....	.181
Aniline, Oil, drs.....lb.	.13	.14	.12	.14	.14½	.13
Anthraquinone, sub, bbls....lb.	....	.70	....	.70	....	.70
Antimony Oxide, bgs.....lb.	.26	.27½	.21	.31	.15	.21¼
Arsenic, whi, bbls, powd....lb.	.06	.08	.05	.08	.04	.05¾

US P $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Barium Carbonate precip, wks, bgs ton	67.50	82.00	60.00	82.00	60.00	75.00
Chloride, tech, cryst, bgs, zone 1 ton	85.00	95.00	73.00	95.00	73.00	78.00
Barytes, floated, paper bgs. ton	no prices		....	41.95	....	41.95
Bauxite, bulk mines ton	8.50	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, cbys, drs lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, frt all'd gal.	....	.19	....	.19	....	.17
Benzyl Chloride, cbys lb.	.20	.28	.20	.28	.20	.24
Beta-Naphthol, tech, bbls, wks lb.	.23	.29	.21	.29	.21	.24
Bismuth metal, ton lots lb.	....	2.00	....	2.00	1.25	1.80
Blanc Fixe, 66⅔% Pulp, bbls, wks ton	55.00	60.00	40.00	60.00	40.00	46.50
Bleaching Powder, wks. 100 lbs.	2.75	3.75	2.50	3.75	2.50	3.60
Borax, tech, c-l, bgs ton	53.50	56.00	45.00	56.00	....	45.00
Bordeaux Mixture, bgs lb.	.15	.23	.11	.23	.11	.11½
Bromine, cases lb.	.21	.23	.21	.23	.21	.23
Butyl, acetate, norm, drs lb.	.30½	.31½	.26	.33½	.1860	.26½
Cadmium Metal lb.	1.75	1.80	....	1.80	.90	1.55
Calcium, Acetate, bgs. 100 lbs.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	90.00	50.00	90.00	50.00	90 00
Chloride, flake, bgs, c-l ton	21.50	38.00	18.50	38.00	18.50	38.00
Solid, 73-75% drs, c-l ton	21.00	37.50	18.00	37.50	18.00	37.50
Cy'n'd, min. 21% N, c.l. lb.	.02¼	.02¾	.02¼	.02¾	....	....
Gluconate, USP, bbls lb.	.58	.65	.57	.65	.57	.59
Phosphate tri, bbls, c-l lb.	6.50	6.80	6.50	6.80	....	.0635
Camphor, USP, gran, powd, bbls lb.	.72	.78	.75	.82	.69	.82
Carbon Bisulfide, 55-gal. drs. lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drs lb.	.06½	.07	.06	.07	.69	.80
Casein, Acid Precip, bgs, 10,000 lbs. or more lb.	.30	.34	.26	.35	.24	.33
Chlorine, cyls, lcl, wks, contract lb.	.09	.10½	.08¾	.10½	....	.07¼
cyls, c-l, contract lb.	....	.06¾	....	.06¾	....	.05¼
Liq, tk, wks, contract 100 lbs.	....	2.00	....	2.30	....	2.30
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, wks, crude bbl.	9.50	10.00	8.25	10.00	8.25	9.00
Cobalt, Acetate, bbl lb.	....	.83¾	....	.83¾	....	.83¾
Oxide, black kgs lb.	1.275	1.80	....	1.30	1.80	1.84
Copper, metal 100 lbs.	....	21.50	21.50	24.00	12.00	14.75
Conbonate, 52-54%, bbls. lb.	.24	.26	.19½	.26½	.19½	.20½
Sulfate, bgs, wks cryst. 100 lbs.	7.60	8.00	7.10	8.60	5.00	7.25
Copperas, bulk, c-l, wks ton	....	14.00	....	14.00	....	14.00
Cresol, USP, drs lb.	.14	.15¾	.13¾	.15¾	.10¾	.14¼
Dibutylamine, c-l, drs, wks. lb.	....	.76	....	.76	....	.66
Dibutylphthalate, drs lb.	.32	.34½	.29	.34½	.17	.29½
Diethylaniline, drs lb.	....	.48	....	.48	....	.48
Diethyleneglycol, drs, wks lb.	.14	.15	.14	.15	.14	.15
Dimethylaniline, drs, cl., lcl. lb.	.21	.24¼	.20	.24¼	.21	.22
Dimethylphthalate, drs lb.	.23½	.24¾	.20	.24¾	.20	.20½
Dinitrobenzene bbls lb.	....	.16	....	.16	....	.18
Dinitrochlorobenzene, dms. lb.	.14	.15½	.14	.15½	....	.14
Dinitrophenol, bbls lb.	....	.22	....	.22	....	.22
Dinitrotoluene, drs lb.	....	.18	....	.18	....	.18
Diphenyl, bbls, lcl, wks lb.	.15	.20	.15	.20	.16	.20
Diphenylamine bbls lb.	....	.25	....	.25	....	.25
Diphenylguanidine, drs lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate syn. 85-90% tks, frt. all'd lb.	.09½	.12	.09½	.12	....	.09½
Chloride, USP, bbls lb.	.20	.22	.18	.22	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, drs lb.	.08½	.09½	.08½	.09½	.0842	.0941
Glycol, dms, cl lb.	....	.12	....	.12	....	.10
Fluorspar, No. 1, grd. 95-98% bulk, c-l mines ton	....	37.00	....	37.00	....	37.00
Formaldehyde, bbls, cl & lcl. lb.	.0645	.0745	.0520	.0745	.0520	.0570
Furfural tech, tks lb.	....	.09½	....	.13	....	.13
Fusel Oil, ref'd. drs, dlvd lb.	.26½	.27½	.18½	.27½	.18½	.19½
Glauber's Salt, Cryst, bgs, wks 100 lbs.	1.25	1.75	1.05	1.75	1.05	1.45
Glycerine dynamite, drs, c-l. lb.	....	.29½	.29½	.75¾	.17	.55¼
Crude Saponification, 88% to refiners tks lb.	.23	.24	.23	.60	....	.60
GUMS						
Gum Arabic, amber sorts bgs. lb.	.14	.15	.13¾	.15	.11¾	.14½
Benzoin, Sumatra, cs lb.	.50	.60	.50	1.00	.52	1.70
Copal, Congo No. 1, bgs lb.	.26	.29	.26	.29	....	.55¾
Copal, East India, chips lb.	no prices		....no prices		....	.55¾
Macassar dust lb.	no prices		....no prices		....	.07¾
Copal Manila lb.	no prices		.25	....	.13½	.25
Copal Pontianak lb.	no prices		....no prices		....	.17¾
Karaya, bbls. bxs. drs lb.	.20	.51	.20	.55	.18	.50

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less than carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

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17 PLANTS TO SERVE THE NATION

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Kauri, N. Y.						
Superior Pale XXX ..lb.	no prices		....	nom.	....	.65¾
No. 3 ..lb.	no prices		....	nom.	....	.22
Sandarac, cks ..lb.	.95	1.00	.85	1.00	.90	.99½
Tragacanth, No. 1, cases ..lb.	3.60	8.70	3.60	8.70	3.75	5.25
No. 3 ..lb.	2.00	2.50	2.00	3.45	2.10	3.45
Yacca, bgs ..lb.	.06	.07	.06	.07	.05	.07¼
Hydrogen Peroxide, cabys ..lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars ..lb.	2.35	2.65	....	2.65	1.75	2.10
Lead Acetate, cryst, bbls ..lb.	....	.19¼	....	.19¼	....	.16¾
Arsentate basic, bg, lcl ..lb.	.22¾	.23¾	....	.23¾	.12	.18
Nitrate, bbls ..lb.	.17¾	.18	....	.18	....	.12½
Red, dry, 95% Pb_3O_4 bbls ..lb.	.178	.18½	.14¼	.19¼	.09	.16
97% Pb_3O_4, bbls delv ..lb.	.1785	.18¾	.15	.19½	.09½	.16¾
98% Pb_3O_4, bbls delv ..lb.	.1810	.19	.15¼	.19¾	.08¼	.17
White, bbls ..lb.	.16	.16¼	.13	.17¾	.07¼	.14¼
Basic sulfate, bbls, lcl ..lb.	.15¼	.15½	.12½	.15½	.07¾	.13¾
Lime, Chem., wks, bulk ..ton	6.50	10.25	6.50	10.25	6.50	10.25
Hydrated, f.o.b. wks ..ton	8.00	12.14	8.00	12.14	8.50	12.00
Litharge, coml, delv, bbls ..lb.	.1660	.17½	.13	.17½	.08	.15¼
Lithopone, ordi., bgs ..lb.	.05½	.06	.03	.06	.04¼	.05¾
Magnesium Carb, tech, wks ..lb.	.07¼	.10¾	.07¼	.10¾	.07¼	.10¾
Chloride flake, bbls, wks c-l ..ton	....	37.00	....	37.00	....	32.00
Manganese Chloride, Anhyd. bbls ..lb.	.14	.16	.14	.16	.14	.18
Dioxide, Caucasian bgs, lcl ..ton	74.75	79.75	74.75	79.75	74.75	79.75
Methanol, pure, nat, drs ..gal. *l*	.63	.73	.63	.73	.63	.73
Synth, drs cl ..gal. *m*	.34½	.41½	.31	.41½	.24	.38
Methyl Acetate, tech tks ..lb.	.06	.07	.06	.07	.06	.07
C. P. 97-99%, tks, delv ..lb.	.09½	.10½	.09½	.10½	.09½	110½
Chloride, cyl ..lb.	.33	.41	.32	.41	.32	.40
Ethyl Ketone, tks, frt all'd ..lb.	....	.09	....	.09	....	.09
Naphtha, Solvent, tks ..gal.	....	.28	....	.28	....	.27
Naphthalene, crude, 74°, wks, tks ..lb.	no prices		.035	.083	.0275	.035
Nickel Salt, bbls, NY ..lb.	.14	.14½	.14	.14½	.13	.14¾
Nitre Cake, blk ..ton	20.00	24.00	....	24.00	....	16.00
Nitrobenzene, drs, wks ..lb.	.08½	.10	.08	.09½	.08	.09
Orthoanisidine, bbls ..lb.	....	.70	....	.70	....	.70
Orthochlorophenol, drs ..lb.	....	.37	.25	.37	.25	.27
Orthodichlorobenzene, drs ..lb.	.07½	.10½	.07	.10½	.07	.08
Orthonitrochlorobenzene, wks ..lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, drs ..lb.	.08	.09	.08	.09	....	.09
Paraldehyde, 98%, wks lcl ..lb.	.12½	.13½	.22	.13½	....	.12
Chlorophenol, drs ..lb.	.25	.29	.24	.29	.24	.27
Dichlorobenzene, wks ..lb.	.12½	.14	.12½	.14	.11	.17
Formaldehyde, drs, wks ..lb.	.21	.22	....	.22	.21	.22
Nitroaniline, wks, kgs ..lb.	.41	.43	.41	.43	.41	.45
Nitrochlorobenzene, wks ..lb.	....	.15	....	.18	....	.18
Toluenesulfonamide, bbls ..lb.	....	.70	....	.70	....	.70
Toluidine, bbls, wks ..lb.	.44	.53	....	.53	....	.48
Penicillin, ampules per 100,000 units, bulk	.14	.19	.14	.38	.38	.95
Pentaerythritol, tech ..lb.	.32	.36	.27	.36	.27	.31

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast ..gal.	.13	.14	....	.14	.11½	.12½
Naphtha East tks, wks ..gal.	.11	.11½	....	.11	.11	.12
Rubber solvents, East, tks, wks ..gal.	.12½	.13	....	.12	.11	.12
Stoddard Solvents, East, tks, wks ..gal.	.11½	.12	....	.12	.10	.12

Phenol, U.S.P., drs ..lb.	.11¼	.13¼	.11¼	.13¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks ..lb.	.14½	.18½	.14½	.15½	.13	.15½
Potash, Caustics, 88-92%, wks, sol ..lb.	.06¾	.07½	.06¼	.07½	.06¼	.06¾
Flake, 88-92% ..lb.	.07½	.08¾	.07	.08¼	.07	.07½
liquid, 45% basis, tks ..lb.	....	.03½	....	.03½	....	.02½
drs, wks ..lb.	.0337½	.0375½	.03¼	.04	.03	.03½
Carbonate hydrated 83-85%, bbls ..lb.	.05¾	.06	.06	.05¾	....	.05½
Chlorate crys, kgs, wks ..lb.	.08½	.09¾	.08½	.13	.11	.13
Chloride, crys, tech, bgs, kgs ..lb.	.08	nom.	.08	nom.	.08	nom
Cyanide, drs, wks ..lb.	....	.55	....	.55	....	.55
Iodide, drs ..lb.	1.95	1.98	1.44	1.98	1.44	1.48
Muriate dom, 60-62-63% K_2O bulk unit-ton	.37½	.53½	.37½	.53½	.53½	.56½
Permanganate, USP, wks drs ..lb.	.22½	.23	.20½	.23	.20½	.21
Sulfate, 90%, basis, bgs ..ton	36.25	39.25	36.25	39.25	36.25	39.25
Propane, group 3, tks ..gal.	....	.03½	....	.03¾	....	.03¾
Pyridine, reg., drs ..lb.	.60	.65	.55	.65	.45	.55½
R Salt, 250 lb. bbls, wks ..lb.	.61	.72	....	.72	....	.65
Resorcinol, tech. drs, wks ..lb.	....	.68	.64	.74	.64	.74
Rochelle Salt, cryst ..lb.	.34½	.35	.34½	.35	.34½	.47
Salt Cake, dom, blk wks ..ton	20.00	26.00	....	26.00	....	15.00
Saltpeter, grn, bbls ..100 lbs.	8.00	9.50	8.20	9.50	8.20	9.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided into 4 zones, prices varying by zone. Spot price is ½c higher.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Shellac, blchd. bone dry, bbls.....lb.	.58½	.59	.65	.74½	.42½	.74½
Silver Nitrate, bots, 2,500-oz. lots.....oz.	.42¼	.45½	.42¼	.59	.47	.59
Soda Ash, 58% dense, bgs, c-l, wks.....100 lbs.	....	1.38	....	1.38	....	1.28
58% light, bgs cl....100 lbs.	....	1.30	....	1.30	1.05	1.20
Caustic, 76% flake drs, cl.....100 lbs.	....	3.00	2.90	3.00	....	3.00
76% solid, drs, cl..100 lbs.	....	2.60	2.50	2.75	....	2.75
Liquid, 47-49%, sellers, tks.....100 lbs.	....	2.10	....	2.10	....	2.10
Sodium Acetate, anhyd. drs.....lb.	.06½	.11	.06½	.11	.08½	.10
Benzoate, USP drs.....lb.	.46	.52	.46	.52	.46	.52
Bicarb, USP, gran., bgs, cl., works.....100 lbs.	....	2.25	2.25	2.59	1.55	2.59
Bichromate, bgs, wks l.c.l..lb.	.08¾	.09¾	.07⅞	.09¾	.07⅞	.08⅛
Bisulfate powd, bbls, wks.....100 lbs.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls, wks.....100 lbs.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks cl.....lb.	....	.06¼	....	.06½	....	.06¼
Cyanide, 96-98%, drs.....lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, drs...lb.	.09¾	.10	.07¼	.10	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks.....100 lbs.	....	2.75	...	2.75	....	2.25
Metasilicate, gran, bbl, wks c-l.....100 lbs.	....	3.40	....	3.40	....	3.40
Nitrate, imp. bgs.....ton	....	42.50	....	42.50	33.00	38.50
Nitrite, 96-98% bbl. cl....lb.	....	.06¾	....	.06¾	....	.06¾
Phosphate, dianhyd. bgs, wks.....100 lbs.	6.25	7.00	6.00	7.00	6.00	6.75
Tri-bgs, cryst, wks.100 lbs.	3.50	3.90	2.70	3.90	2.70	3.10
Prussiate, yel. bbls, wks...lb.	....	.12¼	....	.12¼	....	.11
Silicate, 52°, drs, wks...100 lbs.	1.55	2.00	1.40	2.00	1.40	1.80
40°, drs, wks, c-l...100 lbs.	.95	1.15	....	1.15	....	.80
Silicofluoride, bbls, NY...lb.	.07½	.08½	.06½	.08½	.06½	.10
Sulfate tech, Anhyd, bgs.....100 lbs.	2.10	2.60	1.70	2.60	1.70	2.20
Sulfide, cryst c-l, bbls, wks.....100 lbs.	....	3.25	....	3.00	....	2.40
Solid, bbls, wks.....lb.	3.50	5.50	3.05	5.50	3.15	3.90
Starch, Corn, Pearl, bgs.100 lbs.	6.37	7.17	4.99	7.17	4.321	6.271
Potato, bgs, cl.....lb.	.0875	.1075	.0875	.1075	.0735	.0760
Rice, bgs.....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs.....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines.....ton	16.00	18.00	16.00	18.00	....	16.00
Flour, USP, precp, bbls, kgs.....lb.	.18	.30	.18	.36	.18	.36
Roll, bbls.....100 lbs.	2.65	3.40	2.65	3.40	2.40	3.40
Sulfur Dioxide, liquid, cyl...lb.	....	.085	.07	.095	.07	.08
tks, wks.....lb.	....	.044	....	.044	....	.04
Talc, crude, c-l, NY.....ton	....	15.00	....	15.50	....	15.50
Ref'd, c-l, NY.....ton	14.50	24.50	14.50	24.50	13.00	21.00
Tin, crystals, bbls, wks.....lb.	.55	.60	....	.60	no stocks	
Metal.....lb.	....	.80	....	.80	....	.70
Toluol, drs, wks.....gal.	....	.28	....	.28	.27	.32
tks, frt all'd.....gal.	....	.23	....	.23	.22	.27
Tributyl Phosphates, drs, lcl. frt all'd.....lb.	.68	.72	....	.72	....	.65
Trichloroethylene, drs, wks..lb.	.09¼	.10½	.08	.10½	.08	.09
Tricresyl phosphate tks.....lb.	.32¼	.33	.32¼	.33	....	.32
Triethylene glycol, drs.....lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos., bbls.....lb.	.26	.27	.26	.32	.26	.32
Urea, pure, cases.....lb.	....	.12	....	.12	....	.12
Wax, Bayberry, bgs.....lb.	no stocks		no stocks		no stocks	
Bees, bleached, U.S.P. cakes.lb.	.65	.72	.68	.72	.60	.70
Candelilla, bgs, crude.....lb.	.62	.65	.62	.80	.62	.86
Carnauba No. 1, yellow, bgs, ton.....lb.	1.30	1.55	1.30	2.00	1.80	2.04
Xylol, Indus., frt all'd, tks wks.....gal.	.23	.25	....	.23	....	.26
Zinc Chloride tech, fused, wks.....lb.	.0625	.0655	.05	.0655	.05	.0535
Oxide, Amer., bgs, wks....lb.	.095	.0975	.09	.09¾	.07	.09¼
Sulfate, crys, bgs....100 lbs.	4.15	4.90	3.40	4.90	3.40	4.15
OILS AND FATS						
Babassu, tks.....lb.	.14½	.24	.14½	.24	.11	.12
Castor, No. 3, drs. c.l.....lb.	.27½	.34¼	.27¾	.34¾	....	.29¾
China Wood, drs, spot NY..lb.	.25¾	.27	.24	.41	.39	.41
Coconut, edible, drs Atlantic ports.....lb.	.18	.24½	.18	.37	....	.27
Corn, crude, tks, wks.....lb.	.18	.24½	.18.	.37	....	.27
Linseed, Raw, drs, c.l.....lb.	.3160	.3230	.3160	.3960	.1680	.3640
Menhaden, crude tks.....	.19	.20	.19	.20	.1220	.21½
Light, pressed, drs l.c.l....lb.	.16	.19	.16	.29	.1300	.29
Palm, Niger, dms.....lb.	no prices		no prices		....	.0865
Peanut, crude, tks, f.o.b. wks.lb.	.17	nom.	.20	.37	.12⅞	.28½
Perilla, crude, dms, NY.....lb.	no stocks		no stocks		no stocks	
Rapeseed, bulks.....lb.	no prices		....no prices		....	.13
Red, dms.....lb.	.17¾	.21¼	.17¾	.33¾	.13¼	.30¾
Soy Bean, crude, tks, wks...lb.	.15½	.29¾	.15¼	.33	.1175	.2450
Tallow, acidless, dms.....lb.	.19½	.29	.19½	.34½	....	.14¼

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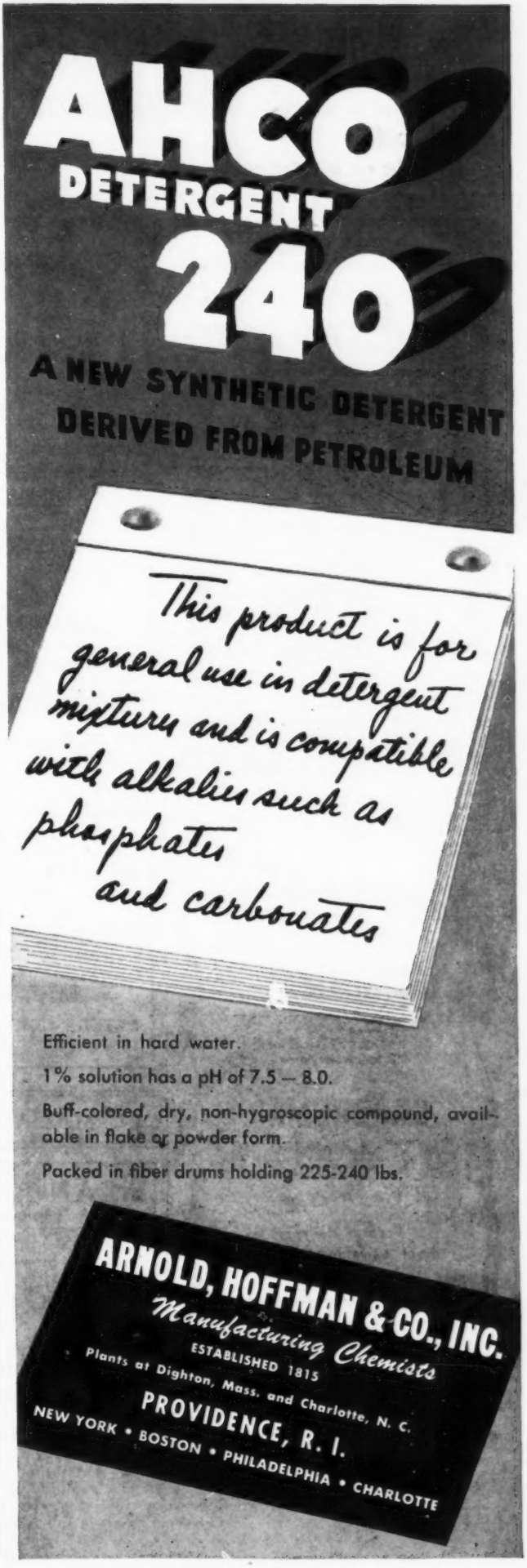
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9—Rotary Vacuum Filter, Oliver, Feinc, Portland, from 3' x 1' to 8' x 12'.

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3—Simpson Intensive Mixers, 18" and 6" bowls.

1—Pfaudler 250 gal. Stainless Reactor, 40" x 54".

6—Readco and Day Jacketed Double Ribbon Mixers, 175 gal. to 210 gal.

33—Heavy Duty Horizontal Jacketed Mixers, double arm, geared both ends, screw tilting, 150 gal. holding; 100 gal. working.

12—Stainless Steel Horizontal Dry Powder Mixers; double spiral ribbon type; all sizes.

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1—Dopploy 800 gal. Jacketed, Agitated Reactor with Tubular Condenser, having nickel tubes.

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10—Single and Double Drum, Atmospheric Dryers or Flakers, up to 4' x 12'.

1—Shriver 24" Bronze P. & F. Filter Press; 48 Chambers; 20 Other Presses, cast iron, wood, etc., from 12" to 42".

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6—Filler Machine Co. and Elgin Piston Filler; 2 to 11 Stainless Pistons.

1—Kiefer 14 Stem Rotary Vac. Filler and 14 Stem Rotary Air Cleaner.

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1—20 HP Gen. Elec. Squirrel Cage 3/60/220 Volts 1160 RPM Type KT 322—Form B.
1—125 HP West. Squirrel Cage Motor, 3/60/2200 V. 1740 RPM with starter.
1—200 HP Gen. Elec. Synchronous Motor, 3/60/4150, 600 RPM, with starting panel. V-belted exciter. New 1943.
1—10 HP Sterling Type KRE enclosed Speed-trol motor 3/60/220/440 volt, 1350/900 RPM.

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23—Buffalo 40" Type R with Everdur Blades w/o motors.
13—Lehigh #1 force draft blowers with 1/6 HP, 1/60/115 volt motors.
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1—Spencer Turbo Compressor 900 CFM at ¾# pressure with 5 HP, 2/60/220 volt motor.
30—Buffalo Forge Type 5E Everdur Wheel with 5 HP 3/60/220/440 volt motor; also w/o motors.
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1—Worthington monobloc size 4 DE 5, driven by 15 HP 3/60/220/440 volt motor.
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1—Peerless Deep Well Turbine Pump 500 GPM 138' head driven by 25 HP 3/60/440 volt motor.
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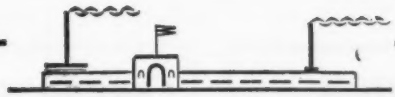

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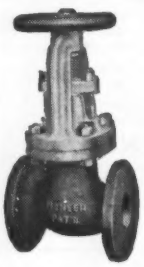

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INDEX *of* ADVERTISERS

Abril Corporation 946
Adam Chemical Co., Inc. 1054
Albretch Chemical Co., Inc. 1075
Allied Asphalt & Mineral Corp. 1063
Alrose Chemical Co. 1078
American Can Co. 1043
American Cyanamid Co. 939
American Potash & Chemical Corp. 1062
Ansul Chemical Co. 1008
Arnold, Hoffman & Co., Inc. 1081
Armour & Co. 938
Aromatics Division, General Drug Co. 1088

Bagpak, Inc. 1031
Baker Castor Oil Co., The 1013
J. T. Baker Chemical Co. 933, 1017
Baker Instrument Co. 1052
Baker & Adamson Co., Division of General Chemical Co. 965
Barrett Division, The, Allied Chemical & Dye Corp. 1064
Beacon Co., The 1057
Bemis Brothers Bag Co. 1041
Bjorksten Laboratories 1087
Bonded Scale Co. Mfrs. 1083
Bower Mfg. Co., Henry 1067
Brill Equipment Co. 1086
Buckeye Cooperage Co. 1086
Burke, Edw. S. 1080

Carbide & Carbon Chemical Corp. 1007
Cargille Scientific Co. 1068
R. P. Cargille 1068
Celanese Corp. of America 959
Chemical Construction Corp. 1035
Chemical & Process Machinery Corp. 1086
Chemical Service Corp. 1087
C. P. Chemical Solvents, Inc. 1082
Chemicolloid Labs., Inc. 1022
Chemische Fabrik Schweizerhall 1074
Chiksan Co. 1028
Church & Dwight Co., Inc. 1055
Claflin, Alan A. 1082
Colorado Asbestos & Mining Co. 1085
Commercial Plastics Co. 1018
Commercial Solvents Corp. 972
Consolidated Chemical Industries 1063
Consolidated Products Co., Inc. 1085
Cook Electric Co. 1034
Cowles Detergent Co., The 1061
Corps of Engineers, U. S. Army 1032
Copywright Carbon Co. 1084
Crosby Chemicals, Inc. 1075
Croton Chemical Corp. 1073

Davison Chemical Corp. 960
Dear, R. B. 1082
Diamond Alkali Co. 961, 1009
Diehl & Co., Wm. 1046
Distributing & Trading Corp. 1044
Doe & Ingalls, Inc. 1082
Drew Co., Inc., E. F. 1019
Dunkel & Co., Paul A. 1067

Eastman Kodak Co. 1051
Eaton-Clark Company 1057
Edwards Mfg. Co., The 1077
Emsco Equipment Co. 1086
English Mica Co., The 1069
Equipment Finders Bureau 1087
Evans Assoc., Ralph L. 1087
Evans Research & Development Corp. 1087

Fergusson Co., Alex Co. 1083
Filter Paper Co., The 1040
Fine Organics, Inc. 1055
First Machinery Corp. 1083
Fisher Chemical Co. 1061
Fisher Scientific Co. 1053
Food Research Labs., Inc. 1087
Freeport Sulphur Co. 1079
Fritzsche Brothers, Inc. 1010
Fulton Bag & Cotton Mills 1051

Gelb & Sons, Inc., R. 1086
General American Transportation Corp. 1027
General Chemical Co., Division Allied Chemical & Dye Corp. ..... 950 & 951
General Drug Co., Aromatics Division 1088
Goodrich Chemical Co., B. F., The 948
Gray & Co., Wm. S. 1069
Greef & Co., R. W. 1080
Greiner Co., Emil, The 1021

Halogen Chemicals Inc. 1083
Hardesty Chemical Co. 935
Harper Co., H. M. The 1089
Harshaw Chemical Co. 942
Heat & Power Co., Inc. 1084, 1085
Heekin Can Co. 1045
Hema Drug Co. 1082
Hercules Powder Co., Inc. 943
Heyden Chemical Corp. 1015
Hodgeman Rubber Co. 1060
Hooker Electrochemical Co. 969
Huisking & Co., Chas. L. 936
Hunt Chemical Works, Inc. 1042
Hutchinson & Son., Inc., W. H. 1086

INDEX *of* ADVERTISERS

Industrial Chemical Sales Division, West Virginia Pulp & Paper Co. 958
Industrial Raw Materials 1054
Iselin & Jefferson Co. 1014

Jefferson Lake Sulphur Co. 1088

Kantilal Sanghvi & Co. 1082
Kelco Co. 957
Kessler Chemical Co., Inc. 1073
Koppers Co., Inc. 1069
Kryszowski, Stanley W. 1087

Ladish Co. 1055
Lamex Chemical Corp. 1044
LaPine & Co., Arthur So. 1082
Lemke & Co., Inc., B. L. 1058
Loeb & Son, H. 1085
Lucidol Corp. 1075

Machinery & Equipment Corp. 1084
Mallinckrodt Chemical Works 955
Mann Fine Chemicals, Inc. 1082
Mann & Co., George 1082
Marine Magnesium Products Corp. 1067
Mathieson Alkali Works, Inc. 934
McCutcheon, John W. 1087
McKesson & Robbins, Inc. 1071
Merck & Co., Inc. 1047
Metalloy Corp. 1070
Millmaster Chemical Co. 1040
Molnar Labs 1087
Monsanto Chemical Co. 962 & 963
Morehouse Industries 1026
Mutual Chemical Co. of America 937

National Aniline Division, Allied Chemical & Dye Corp. 1059
National Technical Labs. 1025
Natural Products Refining Co. 970

Oldbury Electro-Chemical Co. 1061

Patterson-Kelley Co. 1049
Pennsylvania Coal Products Co. 1063
Pennsylvania Salt Mfg. Co. 949
Peters Chemical Co. 1082
Petroleum Specialties 1042
Pfizer & Co., Inc., Chas. 956
Phelps Dodge Mfg. Co. 1049
Pioneer Alloy Products Co. 1088
Pluss-Staufer, A. G. 1079
Polachek, A. H. 1087
Porter Co., Inc., H. K. 1092
Powell Co., Wm. 1033
Precision Scientific Co. 1049
Prior Chemical Corp. 966
Pritchard & Co., J. F. 1074
Proctor & Schwartz, Inc. 1023

Raymond Bag Co. 1095
Reichold Chemicals, Inc. 954
Reilly Tar & Chemical Corp. 1080
Rhodes Chemical Corp. 1082
Rosenthal-Bercow Co. 1073

St. Regis Paper Co. 1038 & 1039
Saranac Machine Co. 1069
Sargent & Co., E. H. 1050
Saskatchewan Chemicals 1079
Sharples Chemicals Inc. Insert between pages 948 & 949
Sharples Corporation, The 947
Signode Steel Strapping Co. 1029
Snell, Foster D. 1087
Solvay Sales Corp. Inside Front Cover
Sparkler Mfg. Co. 1024
Spencer Chemical Co. 945
Sperry & Co., D. R. 1037
Sprout-Waldron & Co. 1030
Standard Oil Co. of Indiana 953
Stanhope, Inc., R. C. 1084
Starkweather Co., Inc., J. U. 1083
Stauffer Chemical Co. Inside Back Cover
Stein Equipment Co. 1085
Sundheimer Co., Henry 1046

Tennessee Products Corp. 1016
Texas Gulf Sulphur Co. 1067
Titanium Alloy Mfg. Co. 940
Joseph Turner & Co. 952

Ultra Chemical Works., Inc. 941
Union Carbide & Carbon Corp. 1007
Union Standard Equipment Co. 1086
U.S. Industrial Chemicals, Inc. 944, Insert between pages 964 & 965
United States Potash Co., Inc. 1057

Vanderbilt Co., Inc., R. T. 1073
Victor Chemical Works 1065
Virginia Smelting Co. 1012

Welch, Holme & Clark Co. 1066
Whittaker, Clark & Daniels, Inc. 1011
Wilkens-Anderson Co. 1077
Wiley & Sons, Inc., John 1089
Winthrop Chemical Co. 1062
Witco Chemical Co. Back Cover
Wyandotte Chemicals Corp. 1091

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"WE"— EDITORIALLY SPEAKING

A DISTRESSED MATRON at the Pacific Chemical Exposition was visiting booth after booth in an effort to find something which would take road tar out of her prize Angora cat's fur—without, of course, hurting the cat. The most practical suggestion offered: a pair of scissors.

DON'T ANYONE TELL US we don't do what we can to help sell naval stores. Some time ago, you recall, we suggested an annual Goosegrease & Turpentine Week, and here's another market (Please don't try to force a prize on us):

Gaston DuBois was telling us about some of his early experiences with Monsanto. One of the intermediates they were making, paranitroaniline, is nasty stuff to handle—very poisonous and easily assimilated through the skin—and it was not uncommon in the early days, before protective measures were known, for workmen to become ill.

But one burly negro seemed to be immune. His casual explanation: "When Ah goes home at night, boss, Ah jes has me a good glass of vinegar and turpentine."

L. SONNEBORN SONS, INC., tells us how some of its white mineral oil was used during the war. Seems that the Quartermaster Corps was disturbed over the high consumption of flavoring extracts and quickly learned (what the GIs had already discovered) that the stuff was 95 per cent alcohol. A switch to oil was made, and the GIs soon found out about that, too.

IT'S SHORTLY AFTER Thanksgiving as we write this, but already the yuletide spirit is upon us. We feel warm with the glow of brotherly love and all that sort of thing.

Not warm enough, though, to make us stop wondering how some advertising agencies manage to make ends meet. We have a typed (but unsigned) letter before us, for example, which speaks of "stucco and kindered surfaces," "calcium and aluminum sterates," and "solvent 50-gether with an 18% solution."

All 50-gether now, how in tarnation do you kinder a surface with a sterate?

A Merry Christmas and a Happy New Year!

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FIFTEEN YEARS AGO

(From Our Files of Dec., 1932)

Two of the ten thousand chemists and chemical engineers within 50 miles of New York are looking to the Chemical Division Relief Fund for jobs or monetary help this winter. Philadelphia and Boston are organizing similar aid groups.

Dr. Irving Langmuir, G. E. chemist, is the second American to receive the Nobel Chemistry prize.

Dr. J. V. N. Dorr, president of the A. I. Ch. E., leads celebration of the 25th anniversary of the organization's founding.

Despite trade barriers in Germany's export markets I. G. reports an upswing in exports and in domestic sales beginning at the end of the third quarter of 1932.

THIRTY YEARS AGO

(From Our Files of Dec., 1917)

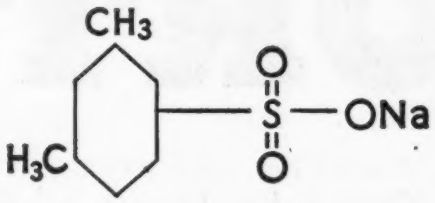
Mallinckrodt Chemical Works celebrates fiftieth anniversary of founding of the company.

Prominent chemical men discuss formation of chemical exchange in order to regulate trading, settle disputes over contracts without resorting to courts.

The salicylic acid plant of Du Pont in Newark, Del., destroyed by explosion and fire. Loss $100,000.

Warner Chemical Co., Carteret, N. J., increases capital from $750,000 to $1,000,000.

Not Isotopes but "Hydrotropes"



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Suggested Uses

Naxonate is useful for extracting pentosans and lignin from wood pulp for the production of cellulose with a minimum of degradation. It is also useful in the processing of bagasse, straw, ramie and other natural fibers.

Naxonate also is suitable for many other diversified uses, for example, as a penetrating agent in rewetting and processing hides in the tanning industry; to assist in the removal of hard-water scale in aqueous systems and as a component of textile spotting compounds.

• Effective November 1, 1947, Wyandotte Chemicals Corporation established a new price schedule which for large l.c.l. shipments represents a price reduction of over 30% for Naxonate 4L and over 10% for Naxonate G. This lower cost may open up many uses for Naxonate heretofore considered uneconomical. • Naxonate 4L and Naxonate G are available in commercial quantities. • The benzene, toluene and p-cymene homologues of sodium xylenesulfonate likewise exhibit hydrotropic properties and are being offered in experimental quantities for your evaluation. • For samples and additional data, write to the Development Department.

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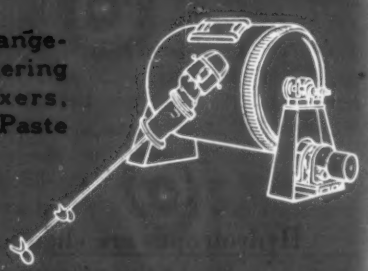

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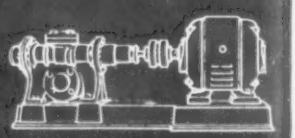

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Abstracts of U. S. and Foreign Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of U. S. patents are available from the Patent Office at 25 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

Requests for further information or photostated copies of Canadian patents should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

U. S. Patents from Official Gazette—Vol. 601, Nos. 1, 2, 3, 4 (July 29—August 18)
Canadian Patents Granted and Published September 30—October 21

*Organic

Canadian

Production of methacrylonitrile by reacting methallyl amine with oxygen in the presence of a silver metal catalyst at a temperature of between about 450°C. and 600°C. No. 443,873. Shell Development Co. (Kenneth E. Marple and Theodore W. Evans).

Method of making an aralkyl phenol. No. 443,941. The Dow Chemical Co. (Ralph P. Perkins and Fred Bryner).

Oxidation process for preparing quinolinic acid. No. 443,966. Merck & Co., Inc. (John B. Conn).

Electrolytic oxidation process for preparing quinolinic acid. No. 443,967. Merck & Co., Inc. (John B. Conn and Jacob van de Kamp).

Process for the production of a polymer of a chlorethenoid compound. No. 444,059. The Distillers Company, Ltd. (Hanns Peter Staudinger and Maurice Dudley Cooke).

Production of a high molecular weight polyhydric alcohol from natural fatty oils and substances derived therefrom. No. 444,143. American Cyanamid Co. (William B. Johnston).

Resinous composition comprising furfuryl alcohol heat-resinified in the presence of from 1 to 10 per cent by weight of cholrinated tricresyl phosphate containing chlorinated methyl radicals. No. 444,340. Canadian General Electric Co., Ltd. (Birger W. Nordlander).

*Packaging

Producing waterproof laminated material for making bags and the like. No. 2,423,294. Edward H. Colesworthy.

Water-tight and air-tight bag. No. 2,423,889. Victor H. Hurt to United States Rubber Company.

Collapsible fiberboard container. No. 2,423,942. Joseph C. Lang to Bocjl Corporation.

Heat sealing with partially hydrolyzed polyvinyl acetate. No. 2,424,110. George Osman Morrison and Thomas Patton Gladstone Shaw to Shawinigan Chemical Limited.

Apparatus for producing tight wrapped cartons containing pulverulent material in which cartons having flaps open at top are filled and top flaps folded but not adhesively held in overlapping relation. No. 2,424,406. Donald E. Marshall and Francis Ross Clark to Colgate-Palmolive-Peet Company.

*Paints, Pigments

Preparing resin composition capable of forming non-skinning emulsion in water comprises neutralizing with sodium silicate and ammonia the adduct of maleic anhydride and glyceride drying oil, anhydride rings of adduct being opened before neutralization. No. 2,423,230. George E. Eilerman to Pittsburgh Plate Glass Company.

Separating polymeric fractions of heat polymerized drying oil. No. 2,423,751. Isidor M. Bernstein to H. D. Roosen Company, Inc.

Water-in-oil emulsions suitable for use as varnishes and paints. No. 2,424,458. Gustaf Bristol Heijmer.

*Paper, Pulp

Beater for disintegrating paper containing resin. No. 2,423,097. Michael Goehler, Frank H. Reimer and Eugene F. Davis to American Cyanamid Company.

Aqueous emulsion components of which are kerosene boiled linseed oil, mahogany soap, and water, for use as agent for preventing foam on stock feed of paper-making machine. No. 2,423,214. Sidney D. Wells to The Institute of Paper Chemistry.

Refined chemical pulp product containing not more than 0.15% of natural ether-extractable matter and having incorporated therein from 0.01% to 0.25% by weight of mixed ether, etc. No. 2,423,469. Paul Henry Schlosser and Kenneth Russell Gray to Rayonier Incorporated.

Applying to paper extremely thin coatings of chlorinated rubber. No. 2,423,555. Clarence D. Ender to Hercules Powder Company.

Apparatus for determining gel-point of cellulose derivative solutions which undergo gelation upon cooling. No. 2,423,687. Harry I. Davis and Daniel E. Farwell Eastman Kodak Company.

Papermaker's felt for use in manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, comprising endless woven and fulled structure having warp and filler yarns, etc. No. 2,423,828. Zephir J. Chagnon to Albany Felt Company.

*Petroleum

Emulsifiable oil comprising major proportion of hydrocarbon oil having dissolved therein organic oil-in-water emulsifier and alkali metal polyorthophospate having general formula described in patent. No. 2,423,144. George W. Gregg to Shell Development Company.

Mud laden drilling fluid containing major proportion of clay, water and portion sufficient to substantially reduce viscosity of mud of product formed by heat treating monosodium hydrogen orthophosphate anhydrous. No. 2,423,154. Jolly W. O'Brien.

Recovering desirable liquefiable constituents from distillate well gas initially at pressure at least as high as pressure within retrograde condensation range of constituents. No. 2,423,156. Laurance S. Reid.

Production of aromatic hydrocarbons from sulfur-bearing olefinic petroleum fractions. No. 2,423,176. Robert M. Cole to Shell Development Company.

Production of hydrogen and aromatic hydrocarbons from paraffinic hydrocarbons within gasoline boiling range. No. 2,423,328. Edwin T. Layng to The M. W. Kellogg Company.

Resolving petroleum emulsions of water-in-oil type. No. 2,423,364. Charles M. Blair, Jr. and Dale M. Schulz to Petrolite Corporation, Ltd.

Producing aromatics and diolefins from petroleum. No. 2,423,374. Newcomb K. Chaney to The United Gas Improvement Company.

Determination of proportion of diolefine material present in mixed gases and also containing considerable proportion of other material of density different from density of diolefine material. No. 2,423,377. Bassett Ferguson, Jr. to The United Gas Improvement Company.

Synthesizing branched-chain hydrocarbons of high anti-knock rating boiling in gasoline range by alkylation reaction between olefin and branched-chain paraffin hydrocarbon. No. 2,423,401. Arlie A. O'Kelly, Robert H. Work, and Julius Plucker, III to Socony-Vacuum Oil Company, Inc.

Stabilizing light petroleum solvent which, when boiling, normally causes substantial discoloration of copper strip immersed therein for thirty minutes. No. 2,423,406. Eugene T. Scafe and John Herman to Socony-Vacuum Oil Company, Inc.

Recovering diolefins from hydrocarbon mixtures. No. 2,423,414. Frank J. Soday to The United Gas Improvement Company.

Cracking hydrocarbons consists in subjecting hydrocarbons to suitable cracking conditions of time, temperature and pressure in presence simultaneously of a small amount of oxygen and small amount of a halogen, etc. No. 2,423,493. Hillis O. Folkins to The Pure Oil Company.

Cracking of hydrocarbons in presence of halogen-containing sensitizers. No. 2,423,494. Hillis O. Folkins and Carlisle M. Thacker to The Pure Oil Company.

Continuous process for cracking of oil and generation of power. No. 2,423,527. Michael Steinschlaeger.

Isomerizing olefin which includes treating olefin under isomerizing conditions with aluminum sulfate supported on diatomaceous silica of slightly acid reaction. No. 2,423,612. Maurice J. Mulligan and Paul L. Cramer to General Motor Corporation.

In olefinic polymerization process, steps in combination of mixing liquefied isoolefin and diluent-refrigerant at below −101°C adding thereto liquid boron trifluoride dissolved in solvent, etc. No. 2,423,760. Norman M. Elmore to Standard Oil Development Company.

Pour point depressant composition for addition to wax containing petroleum hydrocarbon oil having normally relatively high pour point due to wax contained therein. No. 2,423,789. Thomas G. Murphy and Jacob Faust to L. Sonneborn Sons, Inc.

Oil and water separator comprising oil collecting pipe, admission pipe and oil discharge pipe, both directly connected with oil collecting pipe and ranged at same level, etc. No. 2,423,793. Walter L. Olivo and Joseph B. Terrell.

Apparatus for mixing ingredients with drilling mud including settling pit, main circulating line for conveying drilling mud from pit to well and back to pit, pump for forcing drilling mud through circuit, etc. No. 2,423,801. John I. Sloan.

Lubricant for timepieces and the like comprising from 60-80 parts by weight of tricresyl phosphate (M.P.) from 25-7 parts by weight of ethylene glycolmonoethyl ether ricinoleate, and from 15-13 parts by weight of triethylene glycol di-2-ethylbutyrate. No. 2,423,844. John D. Morgan and Russell E. Lowe to Cities Service Oil Company.

Isomerizing normal paraffin containing at least four carbon atoms per molecule in vapor phase by contacting same under isomerization reaction conditions and in presence of promotional amounts of hydrogen chloride with catalyst mass comprising porour carrier dehydrated to water content of less than 2%, etc. No. 2,423,845. Norval F. Myers to Standard Oil Development Company.

Isomerizing normal paraffinic hydrocarbons to isoparaffinic hydrocarbons in reaction system in which body of metal halide vaporizable at temperature not in excess of 500°F is arranged ahead of bed of porous material adapted to adsorb metal halide, etc. No. 2,423,846. Hampton G. Corneil to Standard Oil Development Company.

Reforming low knock rating gasoline to produce high knock rating motor fuels. No. 2,423,947. Edgar C. Pitzer to Standard Oil Company.

Refining crude petroleum oil comprises subjecting it to continuous countercurrent extraction with solution consisting of alkylol amine dissolved in low molecular weight water-soluble oxygen-containing organic solvent to remove naphthenic acids from crude oil, etc. No. 2,424,158. Mack C. Fuqua and John B. Lovell to Standard Oil Development Company.

Extreme pressure lubricating agent containing chlorine in active form, sulfur, and corrosion preventing amount of compound having general formula described in patent. No. 2,424,204. John C. Zimmer and John G. McNab to Standard Oil Development Company.

*Photographic

Photographic gelatino-silver-halide emulsion which contains sensitizing dye of general formula described in patent. No. 2,423,217. Alfred W. Anish and Lee C. Hensley to General Aniline & Film Corporation.

Producing an iodine image comprises transforming image in silver in permeable, relatively water-insoluble carrier to image comprising manganese dioxide by reacting silver image with permanganate, reacting last-named image with iodide in presence of acid. No. 2,423,473. Arthur Barnes and Helen Husek to Polaroid Corporation.

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* *U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4.*
Canadian from August 26 - September 30, 1947.

Producing dichroic images comprises converting silver image into insoluble silver salt image, converting second named image into image comprising compound containing releasable iodine. No. 2,423,504. Edwin H. Land and Dexter P. Cooper, Jr. to Polaroid Corporation.

In photographic element light-sensitive silver halide emulsion layer having in intimate contact therewith polyalkylene glycol. No. 2,423,549. Ralph Kingsley Blake, William Alexander Stanton and Ferdinand Schulze to E. I. du Pont de Nemours & Company.

Device for sealing slot in top of photographic film pack casing through which protrude tabs attached to films. No. 2,423,573. Thomas McCowan Aiken to Samuel Hornstein.

Plastic lens comprising material from class consisting of transparent cellulosic plastics. No. 2,423,583. Dexter P. Cooper, Jr. to Polaroid Corporation.

Photographic silver halide emulsion sensitized with at least one sensitizing dye selected from group consisting of 2'-cyanine salts and oxacarbocyanine salts. No. 2,423,710. Edward B. Knott to Eastman Kodak Company.

Flexible photographic film element comprising transparent flexible support composed of orientable polyvinyl fluoride, etc. No. 2,423,749. Paul Rolland Austin to E. I. du Pont de Nemours & Company.

Tone-control agents for silver halide emulsions. No. 2,423,767. Douglas James Fry and James Douglas Brooks to Ilford Limited.

Silver halide emulsions sensitized with cyanine dyes containing a benzothiophenothiazole nucleus. No. 2,424,484. Edmund B. Middleton and George A Dawson to E. I. du Pont de Nemours & Company.

*Polymers

Subjecting cold-drawing organic polymeric filament having recurring tapered units uniformly disposed lengthwise, while passing between drawpoints spaced at distance at least five time length of tapered unit in drawn condition, to tension and heating filament between such points to 40°C-100°C. No. 2,423,182. Reuben T. Fields to E. I. du Pont de Nemours & Company.

New article of manufacture, composite plastic sheet comprising layer of non-hydrophilic transparent plastic layer comprising hydrophilic material integrally formed on one surface of first named layer by regeneration of material thereof and layer comprising molecularly oriented polyvinyl alcohol bonded to regenerated surface layer. No. 2,423,503. Edwin H. Land, Joseph Mahler and William H. Ryan to Polaroid Corporation.

Rendering polyvinyl butyral resins insoluble comprises mixing from 83.4 to 96.5 parts of polyvinyl butyral having free hydroxyl content of from 10% to 20% calculated as polyvinyl alcohol with from 3.5 to 16.6 parts of a butanol modified urea-formaldehyde resin containing from .5 to 1 mol of combined butanol and 2 mols of formaldehyde per mol of urea, etc. No. 2,423,565. Ernest A. Rodman to E. I. du Pont de Nemours & Company.

Composition of matter comprising intimate homogenous mixture of cellulose acetate-butyrate material containing by weight not less than of butyryl, not less than 2% and not more than 22% of acetyl and between 0.2 and 0.5 mol of hydroxyl per glucose unit; between 1 and 25% by weight of cellulose acetate-butyrate material of synthetic linear polyester material. No. 2,423,823. William O. Baker to Bell Telephone Laboratories, Incorporated.

Composition comprising polyvinyl acetal resin, plasticizer therefor, and from 1 to 15 parts of organic amide per 100 parts of resin. No. 2,423,981. David S. Kaltreider to Monsanto Chemical Company.

As plastic mass, inter-condensation product of mixed natural resin acid chlorides and fatty acid chlorides the acid chlorides. No. 2,424,026. Henry I. Gilbert.

Producing interpolymerization product of secondary olefin with tertiary olefin. No. 2,424,143. Orval A. Brown to Standard Oil Development Company.

Canadian

Mouldable polymer of a mixture including toluene and acrylonitrile. No. 443,830. American Cyanamid Co. (Edward L. Kropa).

Starch-melamine moulding composition. No. 443,978. A. E. Staley Manufacturing Co., (Donald W. Hansen).

Process for the production of thick, clear, bubble and strain-free masses of synthetic resinous polymeric material. No. 444,058. The Distillers Company, Ltd. (Hanns Peter Staudinger and Henry Malcolm Hutchinson).

Polyvinyl chloride type film having enhanced resistance to the passage of water vapour. No. 444,065. The Firestone Tire & Rubber Company (Milton R. Radcliffe).

Normally flexible plasticized polyvinyl alcohol composition containing as a thermostabilizing agent from about 3 per cent to about 15 per cent of aluminum chloride. No. 444,363. Resistoflex Corp. (Charles Dangelmajer).

Normally flexible plasticized polyvinyl alcohol composition containing as a thermostabilizing agent cupric sulphate. No. 444,364. Resistoflex Corp. (Charles Dangelmajer).

*Processes and Methods

Separating rosin acids from tall oil comprising preferentially esterifying fatty acids in tall oil with open chain alcohol containing 1 to 5 carbon atoms and consisting of carbon, hydrogen and oxygen, etc. No. 2,423,232. Stephen E. Freeman and Stewart W. Gloyer to Pittsburgh Plate Glass Company.

Producing hydrogenated tall oil acids comprising treating tall oil acids with alkaline material in amount insufficient to saponify more than 5% of acids, hydrogenating tall oil acids so treated. No. 2,423,236. James Harwood and Evan Francis Binkerd to Armour and Company.

Recovering from hydrocarbon gases and vapors, product free from hydrogen sulfide, mercaptans and disulfides, comprises absorbing hydrocarbon gases and vapors in absorbing oil, treating absorbing oil with oil-soluble cuprous compound vaporizing from solution and recovering absorbed hydrocarbon gases and vapors. No. 2,423,238. Charles O. Hoover to Air Reduction Company, Inc.

Removing undersirable odor-producing compounds from material selected from organic thiocyanates selenocyanates, and telluro-cyanates having undersirable odorous compound associated therewith. No. 2,423,291. Joseph N. Borglin to Hercules Powder Company.

Use of Magnesia catalysts in production of butadiene. No. 2,423,681. Darrel J. Butterbaugh and Le Roy U. Spence to Rohm & Haas Company.

Canadian

Process for the dehydration of solvents of other than animal origin by contacting polygalacturonic acids. No. 443,825. African Sisal & Produce Co., Ltd. (Rowland Jay Browne).

*Rubber

Method and apparatus for manufacturing inner tubes. No. 2,423,147. Dorr J. Hinman to United States Rubber Company.

Creaming substance selected from natural rubber latex and synthetic rubber emulsions. No. 2,423,766. Richard D. Freeman to The Dow Chemical Company.

Increasing resistance to aging of vulcanized, cast or extruded deposited neoprene latex articles containing water soluble zinc salt formed during casting or extrusion of polychloroprene, comprises treating articles after vulcanization with gaseous ammonia for at least one hour. No. 2,423,871. Philip D. Brass to United States Rubber Company.

Vulcanizing vulcanizable material selected from rubber and butadiene styrene copolymer synthetic rubber, etc. No. 2,424,175. Paul C. Jones and Roger A. Mathes to The B. F. Goodrich Company.

Synthetic rubber-like material which has high oil and freeze resistance and good processing characteristics, obtained by copolymerizing mixture comprising from 70% to 80% of butadiene, 1,3, 10% to 25% of acrylonitrile, 5% to 10% of aliphatic vinylethinyl carbinol. No. 2,424,182. Charles J. Mighton to E. I. du Pont de Nemours & Company.

Canadian

Method of bonding a rubber to a magnesium metal. No. 444,067. The Firestone Tire & Rubber Company (John Richard Rafter).

Stabilizing synthetic rubber latices prepared by the polymerization of a butadiene -1,3 in aqueous emulsion which comprises dispersing therein a di-(tertiary-alkyl) phenol. No. 444,365. Standard Oil Development Co. (Miller W. Swaney and Fred W. Banes).

*Specialties

Cleaning and preserving composition to be dispersed in water, organic constituents of which comprise 40-55% by weight of wax, major portion of which is non-glyceryl ester wax having minimum melting point of 70-75°C and minor portion of which is ester wax having minimum melting point of 60°C. drying oil 20-50% of total weight of wax 18-22% by weight of water soluble fixed alkali. No. 2,423,137. Glenn P. Beach.

Water soluble germicidal and fungicidal compound having composition represented by formula described in patent. No. 2,423,262. Frank J. Sowa.

Insecticidal composition which contains in intimate admixture, capsicum as irritant agent, sabadilla seed as source of toxic veratrine and methyl crotonic acid and member selected from sulfate, carbonate and hydrate of lime as activator. No. 2,423,284. Francisco E. Babbini.

Electrical insulating oil comprising castor oil and aromatic hydrocarbon oil boiling above 210°C having mixed aniline point below 15°C and separated from petroleum oil gas tar. No. 2,423,413. Frank J. Soday to The United Gas Improvement Company.

Treating soap in form of spray dried particles to reduce dust-forming and lumping tendencies thereof comprises spraying spray dried paticles after formation with 0.5% to 3% of heavy mineral oil fraction. No. 2,423,449. Robert Franklin Heald and Minor Leslie Givan to Colgate-Palmolive-Peet Company.

Preparing detergent particles comprises forming particles of synthetic organic non-soap water-soluble detergent of class consisting of sulphates and sulphonates, and spraying particles after formation with 0.5% to 3% of mineral oil fraction having initial boiling point of about 350°F. No. 2,423,450. Robert Franklin Heald and Minor Leslie Givan to Colgate-Palmolive-Peet Company.

Coating preformed soap particles with water-soluble silicate salt to reduce dust. No. 2,423,451. Stanley Joseph Holuba to Colgate-Palmolive-Peet Company.

Treating spray-dried organic detergent particles comprises step of exposing particles to atmosphere of saturated steam to heat particles above 70°F but below 220°F subjecting particles to impact while in plastic condition until apparent specific gravity has been increased, drying particles. No. 2,423,452. Stanley Joseph Holuba to Colgate-Palmolive-Peet Company.

Preparing parasiticidal dusts and powders includes steps of emulsifying water-insoluble organic toxicant in water at temperature above melting point of toxicant, wetting finely-divided solid carrier with emulsion to form plaster-like slurry, drying mixture, grinding dried residue. No. 2,423,457. George E. Lynn and Bernard J. Thiegs to The Dow Chemical Company.

New chemical fungicidal anti-fouling, insecticidal compound; dry granular hydroxy copper soap of plurality of acids one of which is naphthenic acid and remainder of which is selected from soap-forming acid group consisting of oleic acid, 2-ethylhexoic acid, hydrogenated rosin, cocoanut fatty acid and stearic acid. No. 2,423,611. Arthur Minich to Modex Products Co., Inc.

Fire-foam producing apparatus. No. 2,423,618. Arthur Ferdinand Ratzer to The Pyrene Company, Limited.

Making water-insoluble copper soap. No. 2,423,619. Leo Roon to Nuodex Products Co., Inc.

Producing improved soap product from soap stock resulting from refining animal and vegetable oils. No. 2,423,638. Benjamin Clayton.

Liquid composition having small change of viscosity with temperature change, consists of at least one aromatic compound from toluene, xylenes, mesitylenes, ethyl benzene, triethylbenzene, chlorobenzene, dichlorobenzene, alpha chloronaphthalene, and amyl naphthalene, and between 3 and 5 per cent by weight of polyisobutylene of molecular weight about 100,000 carried thereby. No. 2,423,927. Robert E. Burk and Everett C. Hughes to The Standard Oil Company.

Destroying insects comprising evaporating cyclopropyl alkyl ether having not more than three carbon atoms in alkyl group in air surrounding insects. No. 2,424,029. Herbert L. J. Haller.

Manufacturing liquid starch, cooking mixture of corn starch and water at temperature and for time to cause rupture of all starch granules, adding bluing to starch mixture of type which has less affinity for oxygen than does mixture of corn starch and water, cooling mixture, etc. No. 2,424,050. Joseph S. Pecker and Edwin A. Pecker.

Mothproofing furs comprises immersing furs for 16 hours in bath comprising between 2 and 3% of 40% formaldehyde and between 3 and 4% 31 per cent hydrochloric acid in saturated solution of common salt. No. 2,424,068. David Traill and Andrew McLean to Imperial Chemical Industries, Limited.

Catalyst composition consisting of particles of material selected from silicon, silicon carbide and silicon-silicon carbide mixtures, and adherent pellicular deposit of silver metal. No. 2,424,085. Ingolfur Bergsteinsson and Harry de V. Finch to Shell Development Company.

Fly spray composition containing pyrethrum and amyl amide of 3,6-endomethylene-4-cyclohexene-1,2-dicarboxylic acid dissolved in fly spray base

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** U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4. Canadian from August 26 - September 30, 1947.*

hydrocarbon solvent. No. 2,424,220. Euclid W. Bousquet to E. I. du Pont de Nemours & Company.

Anti-seize composition for spark plug threads subject to extreme temperature variation in use, consisting of uniformly dispersed mixture of 5 to 9 parts by volume powdered graphite, 3 to 7 parts by volume sperm oil and binding agent consisting of 1 to 3 parts by volume of petrolatum. No. 2,424,224. Bernard Costello.

Canadian

Non-foaming emulsion comprising water, a mineral oil, an emulsifying agent and between 0.001 and 0.05 per cent Montan wax. No. 443,875. Standard Oil Development Co. (John C. Zimmer and George M. McNaulty).

*Textiles

Incorporating diphenyl mercury as bacteriostatic and fungistatic agent in textile product. No. 2,423,261. Frank J. Sowa.

Improving bonding properties of cellulosic textile comprises impregnating textiles with acidic aqueous colloidal solution of melamine-x formaldehyde resin in solvent comprising water-soluble polyhydric alcohol and retaining 0.01-2% of resin on cellulosic textiles in water-insoluble condition. No. 2,423,428. John D. Pollard to American Cyanamid Company.

Improving bonding properties of non-cellulosic organic textiles comprises impregnating textile with acidic aqueous colloidal solution of melamine-formaldehyde resin in solvent comprising water-soluble polyhydric alcohol and retaining 0.01-2% of resin on textiles in water-insoluble condition. No. 2,423,429. John D. Pollard to American Cyanamid Company.

Forming designs in knitted or woven fabric of synthetic polyamide fibers such as nylon. No. 2,424,124. Elmer F. Seemuller.

Fixing pigments on textile materials, ribbons or films having a basis of cellulose acetate. No. 2,424,284. Henry Charles Olpin, Sydney Alfred Gibson and William Cyril McKnight to British Celanese, Limited.

Forming surface coating of polyvinyl resin on textile fabric. No. 2,424,386. Rudolph Herbert Czeczowitzka to Texproof, Limited.

Production of viscous spinable alkaline solutions of substantial concentration of undenatured peanut globulin possessing freedom from surface felation. No. 2,424,408. Sarah Neilson McGeoch to Imperial Chemical Industries, Limited.

Canadian

Treatment of textile materials having a basis of cellulose acetate to render them flame-proof, fire-proof and drip-proof, which comprises applying a solution of ammonium bromide and 30 per cent of urea. No. 444,001. Camille Dreyfus (George W. Seymour and George C. Ward).

Flameproofing textiles by applying an aqueous-alcoholic solution containing 10 per cent by weight of thiourea, 5 per cent of diammonium methyl phosphate and 10 per cent of ammonium bromide. No. 444,002. Camille Dreyfus (George W. Seymour and George C. Ward).

Biochemical

Production of penicillin comprising growing penicillin forming mold of Penicillium notatumchrysogenum group in submerged culture in liquid nutrient medium until maximum penicillin titer is attained, adjusting pH of medium to 6.0-6.5 by adding phosphoric acid, and harvesting. No. 2,424,832. Walter L. Koerber to E. R. Squibb & Sons.

Increasing riboflavin synthesis of butyl alcohol producing cultures when propagated on carbohydrate-containing nutrient media, containing iron in quantities to inhibit riboflavin synthesis, step comprises adding 2,2'-bipyridine thereto to inactivate preponderant proportion of iron in solution but insufficient to inhibit traces of iron below 1 part per million. No. 2,425,280. Richard J. Hickey to Commercial Solvents Corporation.

Cellulose

Extracting resinous wood in form of chips containing less than 10% moisture petroleum hydrocarbon and hydrous monohydric alcohol. No. 2,424,628. Robert C. Palmer to Newport Industries, Inc.

Ceramics

Abrasive fused product comprising crystals of alpha alumina associated in fused matrix of artificial spinel. No. 2,424,645. Henry N. Baumann, Jr. and Raymond C. Benner to The Carborundum Company.

Making cement comprises grinding cement forming materials at dilution at which grinding mill operates most efficiently, classifying mill discharge in centrifuge capable of separating suspended solids and removing such solids as fast as separated without increasing dilution of mill discharge, etc. No. 2,424,746. Frank A. Downes to Bird Machine Company.

Vitreous enamel composition for use in enameling electrical resistors. No. 2,425,032. Alden J. Deyrup to E. I. du Pont de Nemours & Company.

Dental impression composition, comprising alkali metal alginate, lead silicate and zinc nitrate, which has been dissolved in lower aliphatic alcohol and recovered by evaporation of alcohol. No. 2,425,118. Stanley E. Noyes.

Air hardening refractory mortar comprising dry composition formed of inert refractory filler, particles of which are coated with water soluble aluminum phosphate, and clay. No. 2,425,151. Herbert H. Greger.

Air setting plastic refractory having high green and fired strengths comprising 15 to 25% of high grade refractory clay, refractory filler least 2½% to 5% of water soluble colloidal aluminum phosphate ranging from mono- to dialuminum phosphate. No. 2,425,152. Herbert H. Greger and John J. Reimer.

** U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4.*
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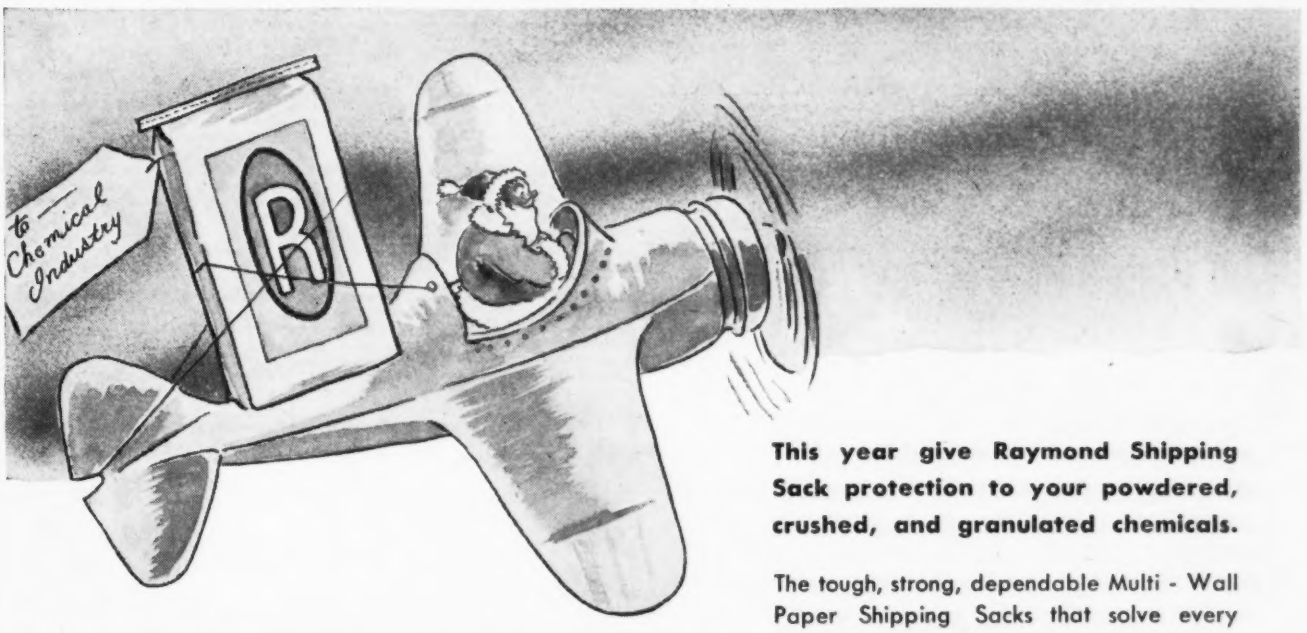

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RAYMOND MULTI-WALL PAPER SHIPPING SACKS

Optical glass resulting from batch preponderantly of **germanium oxide** and containing also alkali fluoride and titanium oxide. No. 2,425,403. Kuan-Han Sun to Eastman Kodak Company.

Abrasive wheel comprising preparing moldable mixture of abrasive grains, clacined magnesite ferrous chloride, magnesium chloride and water, molding composition in desired shape, treating molded composition with aqueous solution of magnesium sulfate and hydrochloric acid. No. 2,425,502. Cecil E. Wilson to Independent Grinding Wheel Company, Inc.

Laminated safety glass comprising two sheets of glass and interlayer of plastic material bonded there between composed of synthetic polyvinyl ketal acetal resin. No. 2,425,568. Joseph D. Ryan and Fred B. Shaw to Libbey-Owens-Ford Glass Company.

Suction method of gathering molten glass. No. 2,425,592. George R. Bowe, Jr., to Owens-Illinois Glass Company.

Fired refractory insulating article consisting of silica of 400 mesh size and finer, non-volatile constituents of 10 to 35% by weight of calcium sulphate hemihydrate, 1 to 5% of alumino-silicate flux. No. 2,425,891. John Charles McMullen to The Carborundum Company.

Producing acid-proof, self-hardening mortars which after hardening are capable of selling in contact with water. No. 2,425,976. Karl Dietz.

Foundry core or mold comminuted refractory mold material of which is bonded with binder, and surfaces of which comminuted refractory mold material are smoothly coated with surface binder consisting of chlorinated derivative of paraffin wax containing from 30% to 85% combined chlorine. No. 2,425,978. Louis E. Anderson, Jr. and Robert A. Coolahan to Hercules Powder Company.

Coloring divided garnet comprises, first wetting batch of garnet with ferric oxide hydrosol which is free of adulterants drying batch to cause ferric oxide to superficially color particles. No. 2,426,020. Frederick P. Hauck.

Manufacturing cement comprises preparing finely-divided mixture of calcium sulphate material, alumina, and silica, and quantity of material selected from FeS_2 organic sulphides, and elemental sulphur, etc. No. 2,426,147. Kund Horn to F. L. Smidth & Co.

Canadian

Dielectric composition comprising an alkaline earth titanate, an alkaline earth stannate and an alkaline earth zirconate. No. 444,680. The Titanium Alloy Manufacturing Company (Eugene Wainer).

Coatings

Fibrous sheet coated with non-asphaltic waterproofing layer. No. 2,-424,-638. Purdum M. Snyder to H. H. Robertson Company.

Coating composition comprising vehicle containing drying oil-modified alkyd or phenol-formaldehyde resin, pigment, litharge, and calcium hydrate. No. 2,424,730. Ladislaus Balassa to E. I. du Pont de Nemours & Company.

Composition for imparting flame- and water resistance to combustible material in single application. No. 2,424,831. Joseph H. Klaber to Quaker Chemical Products Corporation

Applying layer of plastic material to article consisting in taking up plastic material within confines of opening in stencil plate and progressively applying fluid pressure to wad confined within opening, etc. No. 2,424,949. Percy White to T. & T. Vicars Limited.

Preparing clay film includes steps of depositing on amalgamated surface colloidal dispersion comprising clay and clay plasticizing agent. No. 2,425,626. Donald W. Light to American Cyanamid Company.

Dyes

Monazo and disazo dyes with N-substituted 1,3,5 xylidines. No. 2,424,627. Henry Charoles Olpin and John Wright to British Celanese Limited.

Producing mixtures of 4,5'-and 4,8'-dibenzoylamino-1,1'-dianthrimide carbazole dyestuffs. No. 2,425,126. Mario Scalera and Hugh Wendell Stewart to American Cyanamid Company.

Hydrofluoric acid salts of basic triarylmethane dyestuffs of formula described in patent. No. 2,425,569. Arthur E. Schaefer to General Aniline & Film Corporation.

Polymeric carbocyanine dyes. No. 2,425,772. Cyril D. Wilson to E. I. du Pont de Nemours & Company.

Cyanine dyes with recurring cyanine nuclei. No. 2,425,773. Cyril D. Wilson to E. I. du Pont de Nemours & Company.

Polymeric dyestuff intermediates and process for obtaining same. No. 2,425,774. Cyril D. Wilson to E. I. du Pont de Nemours & Company.

Equipment

Electron microscope. No. 2,424,788—2,424,791. Charoles H. Bachman and Simon Ramo to General Electric Company.

Filter comprising sediment trap and drain outlet. No. 2,424,932. Stephen Juhasz.

Detection of toxic gases. No. 2,425,059. William F. Fagen to Stewart-Warner Corporation.

Apparatus and process for improving separation of clarified liquid from slurry by maintaining slurry circulation including flow of slurry adjacent separation interface. No. 2,425,372. Walter H. Green to Infilco Incorporated.

In pyrometer, in combination measuring instrument pair of instrument terminals on said instrument and insulated from each other, extension means having one end for insertion into and removal from instrument terminals, etc. No. 2,425,557. John A. Obermaier.

Explosives

In projectile, hollow shell open at its rear end, propulsive powder charge in shell, flange inwardly turned to form receptacle at open extremity of shell, etc. No. 2,424,934. Melvin E. Kasper.

Projectile comprising jacket having open front end, lead core in jacket having chamber main explosive charge in chamber and spaced from front end thereof, etc. No. 2,424,970. Joseph H. Church and Gregory J. Kessenich.

Artillery primer comprising perforated primer tube, lining composed of paper strip and readily fusible metallic strip wound into tube, etc. No. 2,424,993. Leo Meister.

Explosive composition comprising between 5 and 85% of liquid nitrated organic compound taken from aliphatic liquid nitric esters or aromatic nitrocompounds, 90 to 7% tetryl and 0.1 to 7.1% nitrocellulose. No. 2,425,310. Hartwell Henry Fassnacht and Clifford Akeley to E. I. du Pont de Nemours & Company.

Progressive-burning smokeless powder comprising colloided nitrocellulose, stabilizer and between about 15 and about 65% solid, organic, high explosive material. No. 2,425,854. Harvey B. Alexander to Hercules Powder Company.

Food

Admixing comminuted starchy material with solution of phorphoric acid in volatile organic solvent, evaporating solvent to produce relatively non-hygroscopic dry comminuted product having phosphoric acid dispersed therein. No. 2,424,992. Royal Lee to Lee Foundation for Nutritional Research.

Treating whole fruits and vegetables of types provided with naturally water-repellant waxy or oily skin or peel to impart desired coloration thereto and control shrinkage. No. 2,425,073. Jagan N. Sharma.

Fumigating insect infested grain stored in bins, introducing volatile fumigant comprising as major toxic ingredient solution of from 2.5 to 20% by volume of ethylene bromide in methylene chloride at top of bin and onto surface of stored grain. No. 2,425,238. Fred W. Fletcher and Eugene Kenaga to The Dow Chemical Company.

Isolating pectin from aqueous solution thereof comprises coprecipitating aluminum hydroxide and pectin, improvement comprises effecting coprecipitation by addition of calcium carbonate and aluminum chloride, boiling resultant mixture of coprecipitate and mother liquor. No. 2,425,947. Herbert T. Leo and Clarence C. Taylor.

Inorganic

Treating inedible sea salt to eliminate contamination by red bacillus, comprising mixing sea salt with acid phosphate. No. 2,424,615. Herbert Hempel to Gorton-Pew Fisheries Company, Ltd.

Heating mixture containing in addition to stoichiometrical quantities of calcium sulfate and aluminum capable of reacting with eath other, additional quantity of not more than 95% of aluminum in excess of that required for reaction with calcium sulfate, whereby said excess in presence of intense heat generated by reaction burns in presence of atmospheric oxygen to increase further amount of heat generated. No. 2,424,937. Harry K. Linzell to United States Gypsum Company.

Electrodepositing manganese dioxide compound. No. 2,424,958. Robert F. Clemens to The Dorr Company.

Removing potassium sulfate from an aqueous solution with sodium and potassium carbonates. No. 2,424,975. Guy Ervin, Jr.

Regenerating used aqueous alkali solution from removal of acidic sulfur compounds from hydrocarbon fluids. No. 2,425,414. Donald C. Bond to The Pure Oil Company.

Continuous process for formation of $SiCl_4$. No. 2,425,504. Arnold Belchetz to Stauffer Chemical Company.

Production of, rare earth compounds and thorium concentrates from monazite. No. 2,425.573. Frederick Soddy.

Simultaneously producing nitrous oxide and dehydrating ammonium nitrate. No. 2,425,582. Raymond A. Vingee to The Solvay Process Company.

Producing metal hydrides by reacting hydride-forming metal with hydrogen gas at elevated temperature. No. 2,425,711. Peter P. Alexander to Metal Hydrides Incorporated.

Producing alkaline earth metalhydrides by reacting alkaline earth metal with hydrogen gas at elevated temperature. No. 2,425,712. Peter P. Alexander to Metal Hydrides Incorporated.

Decomposing calcium sulphate substantially free of sulphide to produce solid residue free from sulphur. No. 2,425,740. Knud Horn to F. L. Smidth & Co.

Separation of hydrogen fluoride from water and organic contaminants by distillation and decantation. No. 2,425,752. George E. McKenna and George R. Hettick to Phillips Petroleum Company.

Preparation of hydrogen comprises supplying finely divided catalyst containing metal of iron group and alumina to column of substantial height, maintaining catalyst in mobile state in column, etc. No. 2,-425,754. Eger V. Murphree and Charles W. Tyson, Donald L. Campbell and Homer Z. Martin to Standard Catalytic Company.

Buffered stabilized aqueous solution of hydrogen peroxide having pH falling within the range 2.0 to 6.0 and containing peroxide stabilizer effective in acid range and as buffering agent aliphatic saturated dibasic acid selected from malonic acid, succinic acid, glutaric acid, adipic acid, pimeli acid, suberi acid, azelaic acid and sebacic acid. No. 2,426,154. Joseph S. Reichert and Alfred T. Hawkinson to E. I. du Pont de Nemours & Company.

Canadian

Process for the production of ammonium nitrate in granular form. No. 444,432. Honorary Advisory Council for Scientific and Industrial Research (Lloyd Williams, Leonard Franklin Wright and Robert Hendricks).

Process of making the insoluble anhydrite form of calcium sulphate from other types of calcium sulphate. No. 444,514. Canadian Gypsum Company, Ltd. (Harry K. Linzell, Harold E. Simpson, and Manvel C. Dailey).

Medicinal

Vitamin A acid and its esters and method of making. No. 2,424,994. Nicholas A. Milas to Research Corporation.

Preparing rutin from dried rutin-containing plants comprising extracting rutin by means of aqueous ethyl alcohol having concentration of ethyl alcohol of 35% to 85% by weight. No. 2,425,094. Edward L. Griffi, Jr.

Therapeutic agent for topical application comprising iodine activated by ultra-violet light in presence of chlorophyll heme as source of iron and material continuously evolving oxygen. No. 2,425,285. Albert Strickler to The Hersch-Razel Research Foundation.

Protective ointment containing 20 to 35% by weight of volatile solvent, 10 to 20% of water insoluble film forming ingredient, 2 to 10% of plasticizing ingredient, 5 to 10% water insoluble metallic soap, 1 to 5% of chemical light filtering compound, 25 to 50% titanium dioxide, 0.1 to 3% of wetting agent, 1 to 5% of neutralizing ingredient, ointment characterized by ability to protect skin from burns and frostbite. No. 2,425,311. Gordon Brown Fauley and Andrew Conway Ivy.

Electrical apparatus for sterilizing intestines especially catgut. No. 2,425,422. Laura Arnanz.

Metals, Ores

Beneficiating ores of calcite, barite, strontianite, witherite, and tricalcium phosphate containing siliceous gangue materials. No. 2,424,552. Julius

* *U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4.*
Canadian from August 26 - September 30, 1947.

Bruce Clemmer and Carl Rampacek.

Composite structure including sintered porous ferrous layer bonded to steel supporting back through medium of sprayed copper layer. No. 2,424,557. Donald W. De Bra to General Motors Corporation.

Anodically polishing metals and alloys. No. 2,424,674. Harold I. White to The American Rolling Mill Company.

Electrolytic method of treating tinplate to prevent sulphide discoloration when contacted with sulphur-containing products. No. 2,424,718. Arthur E. Stevenson and Benton Hall Schaub to Continental Can Company, Inc.

Galvanizing apparatus including tank for molten galvanizing metal and ring to discharge gas under pressure against outer surface of tubular magnetic article as it is moved endwise therethrough from tank, etc. No. 2,424,808. Meril L. Eckman to Republic Steel Corporation.

Treating matte containing sulphides of iron and nickel to produce separate iron-bearing and nickel-bearing products. No. 2,424,866. Marvin J. Udy.

Electrodepositing bright and ductile copper, comprises electrodepositing copper from aqueous sulfuric acid solution of copper sulfate, there being added to such solution from 0.1 to 15g./1. of water dispersible brightening agent selected from sulfurized sulfonated hydrocarbons containing six carbon ring and their substitution products in which ring is nuclearly substituted with an alkyl group. No. 2,424,887. John A. Henricks to Houdaille-Hershey Corporation.

Separating magnetic iron oxide scale from iron-containing metal on which scale is formed through heat treatment comprises heating scale-coated surface of metal within less than one second from room temperature to temperature 150° to 500° F permitting metal surface to return to room temperature. No. 2,425,134. Harold A. Strickland, Jr. to The Budd Company.

Cleaning and pickling composition for metal subject to atmospheric corrosion and for removing oxides and other corrosion products from surfaces of metal, comprising pickling acid solution having dissolved therein small proportion of reaction product of an aldehyde and a preformed thiocyanate of a basic, nitrogenous organic compound having at least one nitrogen-containing radical selected from NH2 and NH. No. 2,425,320. William H. Hill to Koppers Company, Inc.

Treating siliceous earth formation containing substances of class consisting of calcium and magnesium compounds to render formation more permeable to fluids. No. 2,425,415. Donald C. Bond and George W. Ayers to The Pure Oil Company.

Removing manganese from calcium metal comprises melting calcium and 0.1 to 15% of aluminum under reduced pressure in presence of argon, further reducing pressure and distilling calcium from mixture. No. 2,425,705. Douglas Alexander Tetu to Dominion Magnesium Limited.

Manufacturing product comprising lead-calcium alloy in which ratio of calcium to lead is maintained at constant value. No. 2,425,725. George M. Bouton and Earl E. Schumacher to Bell Telephone Laboratories, Inc.

Concentrating precious metals in mass consisting essentially of nickel, copper, precious metal and sulfur. No. 2,425,760. William Kelvin Sproule and George Alan Harcourt to The International Nickel Company, Inc.

Treating oxidized zinc ores containing iron oxide and comprising chloridizing step consists in mixing ore with carbon in proper proportion to secure selective chloridizing of zinc and not of iron, etc. No. 2,425,995. Niels C. Christensen to Combined Metals Reduction Company.

Stabilized aqueous suspension of finely comminuted diatomaceous earth containing from 10% to 15% of colloidal bentonite and from 0.6% to 1.0% of ammonium salt of strong mineral acid percentages being on dry weight of earth in suspension. No. 2,426,140. Armand R. Bollaert to Great Lakes Carbon Corporation.

Organic

Preparation of beta lactones. No. 2,424,589. Thomas R. Steadman to The B. F. Goodrich Company.

Preparation of beta lactones. No. 2,424,590. Thomas R. Steadman and Paul L. Breyfogle to The B. F. Goodrich Company.

Dehydrogenating aliphatic hydrocarbons comprises contacting hydrocarbon under dehydrogenating conditions with catalyst comprising molybdenum oxide on zirconium oxide on alumina. No. 2,424,636. John O. Smith, Jr. to Tide Water Associated Oil Company.

Oromatizing aliphatic hydrocarbons comprises contacting hydrocarbons with aromatizing catalyst under aromatizing conditions. No. 2,424,637. John O. Smith, Jr. to Tide Water Associated Oil Company.

Ethylene glycol bis-phenoxyacetoxyacetate. No. 2,424,652. Maurice Leon Ernsberger and Paul Swithin Pinkey to E. I. du Pont de Nemours & Company.

Preparation of ethyl alpha, alpha-dimethylbutyrate comprises bringing a mixture of propylene, ethylene and carbon monoxide, in contact with acid reacting hydrate. No. 2,244,653. Thomas Aven Ford to E. I. du Pont de Nemours & Company.

N-beta-cyanoethylalkane-sulfonamides. No. 2,424,664. David Malcolm McQueen to E. I. du Pont de Nemours & Company.

Symmetrical diiodotetrafluoroethane. No. 2,424,667. Maynard Stanley Raasch to E. I. du Pont de Nemours & Company.

Product obtained by reacting equal volumes of thiophene and vinyl ester selected from vinyl acetate and vinyl propionate, in presence of boron trifluoride. No. 2,424,691. Rowland C. Hansford to Socony-Vacuum Oil Company, Inc.

Preparation and separation of alpha vinyl-naphthalene and beta vinyl-naphthalene from mixtures of alpha and beta ethylnaphthalenes. No. 2,424,841. Joseph E. Nickels to Koppers Company, Inc.

Solid polymeric peroxide of acetonyl acetone having general analysis C6H100x, where x is number including fraction not less than 3 nor more than 4. No. 2,424,851. Hyman Rudoff to Pittsburgh Plate Glass Company.

Producing carbon bisulfide comprises producing molten sulfur composition containing an organic agent which lowers maximum viscosity of composition when used in amount of less than 5%, etc. No. 2,424,894. Leroy F. Marek to Arthur D. Little, Inc.

Thiocarbamyl sulfanamides. No. 2,424,921. George E. P. Smith, Jr. and Edward L. Carr to The Firestone Tire & Rubber Company.

Removing cyclopentadiene from forerunnings fraction with endpoint distilling temperature of not more than 60° C. obtained by fractionating light oil produced in by-product coking of coal. No. 2,424,948. Joseph H. Wells and Philip J. Wilson, Jr. to Carnegie-Illinois Steel Corporation.

Acetic acid ester of 8-methoxy-menthene (1)-7-carbinol. No. 2,424,960. Joseph P. Bain and Albert H. Best to The Glidden Company.

Separating thiocyanate from crude thiocyante material. No. 2,424,983. William H. Hill to Koppers Company, Inc.

Concentration of acetylene from gaseous mixtures comprises, contacting mixture with tetrahydrofurfuryl acetate. No. 2,424,987. Robert M. Isham to Danciger Oil & Refineries, Inc.

New chemical compound chlorine derivative of trimethyl acetonitrile taken from monochlor trimethyl acetonitrile, dichlor trimethyl acetonitrile and a mixture of tetrachlor and pentachlor trimethyl acetonitrile. No. 2,425,029. Oliver W. Cass to E. I. du Pont de Nemours & Company.

Making alkylene glycol diether. No. 2,425,042. Raymond W. McNamee and Louis G. MacDowell to Carbide and Carbon Chemicals Corporation.

Hydrocarbon conversion with Friedel-Crafts type catalyst. No. 2,425,074. Richard C. Waugh to Standard Oil Company.

Production of aromatics comprises dehydrating and cylicizing ketone in presence of catalyst comprising heteropolyacid at above 200°C but not greater than 450°C. No. 2,425,096. Vladimir N. Ipatieff and Carl B. Linn to Universal Oil Products Company.

Nitro-alcohol esters of mono-allyl maleate. No. 2,425,144. Herman A. Bruson and George B. Butler to Rohm & Haas Company.

Preparing esters of beta-nor-borneol comprises reacting organic carboxylic acid with cyclopentadiene-ethylene adduct (bicyclo-(2,2,1)-5-heptene) in presence of acidic condensing agent. No. 2,425,173. Herman A. Bruson to The Resinous Products & Chemical Company.

Producing ethynyl carbinol comprising reacting calcium acetylide with an alpha beta unsaturated ketone under anhydrous conditions in inert solvent, hydrolyzing resultant organic reaction product. No. 2,425,201. William Oroshnik to Ortho Pharmaceutical Corporation.

Separating pyrrole from mixture thereof with pyridine homologs not readily separable from pyrrole by normal fractional distillation, comprises subjecting mixture to fractional distillation in presence of water to separate as distillate water azeotrope of oil enriched in pyrrole. No. 2,425,220. Leo J. Baney to Allied Chemical & Dye Corporation.

Production of salt of symmetrical aromatic diamidine. No. 2,425,221. Harry James Barber to May & Baker Limited.

Production of 4:4'-bis(carbonamidine)-di-beta-hydroxyethane sulphonate of diphenyl ether. No. 2,425,222. Harry James Barber to May & Baker Limited.

Production of alpha-gamma-diphenoxy-propane-4:4'-bis(carbonamidine(-di-beta-hydroxyethane sulphonate. No. 2,425,223. Harry James Barber to May & Baker Limited.

Obtaining thiodiglycolic acid from aqueous inorganic salt solution in which it is produced by reacting alkali metal sulfide with alpha-halogeneated acetic acid salt. No. 2,425,224. Arthur E. Bearse to The C. P. Hall Company.

Producing ester of the class consisting of esters of thiodiglycolic acid and water-soluble alkyl-substituted thiodiglycolic acids. No. 2,425,225. Arthur E. Bearse and Robert R. Cruse to The C. P. Hall Company.

Obtaining acid class consisting of thiodiglycolic acid and water-soluble, alkyl-substituted thiodiglycolic acids from aqueous inorganic salt solution in which it is produced by reacting alkali metal sulfide with alpha-halogenated fatty acid salt in water solution, then acidifying with mineral acid. No. 2,425,226. Arthur E. Bearse to The C. P. Hall Company.

Producing 2-aminopyrimidine by heating reaction mixture of isocytosine, phosphorus oxychloride and "acid-formed" catalyst to temperatures above that at which catalyst is normally formed in presence of isocytosine by violent exothermic reaction between phosphorous oxychloride and sulfuric acid monohydrate, etc. No. 2,425,248. Erwin Kuh and Thomas W. Clapper to American Cyanamid Company.

Preparation of acrylonitrile comprises reacting hydrogen cyanide with acetylene in vapor phase at 770 to 970°F for 6 to 8 seconds in presence of finely divided zinc oxide on asbestos fiber. No. 2,425,267. Walter A. Schulze and John E. Mahan to Phillips Petroleum Company.

Continuous method of isomerizing saturated hydrocarbons. No. 2,425,268. Eugene E. Sensel to The Texas Company.

2,6-dichlorobenzalacetone. No. 2,425,269. Raymond B. Seymour and David T. Mowry to Monsanto Chemical Company.

Aliphatic nitro derivatives of keto-esters and method for preparing them. No. 2,425,276. Carl T. Bahner.

Preparation of aqueous solution of allylglycine comprising reacting at least eight mols of allylamine with one mol of chloracetic acid in aqueous solution at below 20°C adding two mols of alkali, distilling to remove unreacted allylamine. No. 2,425,283. Robert S. Long and Corris M. Hofmann to American Cyanamid Company.

2-hydroxybenzoguanamine-5-azobenzene-4'-sulfonic acid. No. 2,425,286. Jack Theo Thurston and Donald William Kaiser to American Cyanamid Company.

Preparing carboxyarylguanamine. No. 2,425,287. Jack Theo Thurston and Daniel Elmer Nagy to American Cyanamid Company.

Acid stable, water soluble chalcone glycoside having following formula described in patent. No. 2,425,291. Clarence Walter Wilson to California Fruit Growers Exchange.

2-(p-aminobenzene sulfonamido)-4-hydroxy-5,6,7,8-tetrahydroquinazoline. No. 2,425,326. James H. Hunter and Alan H. Nathan to The Upjohn Company.

Depolymerizing olefin polymers comprises contacting polymer at 300°C to 450°C with calcined sulfamic acid treated alumina catalyst. No. 2,425,340. Alan C. Nixon and Orris L. Davis to Shell Development Company.

Production of mon- and unsymmetrically disubstituted guanidines. No. 2,425,341. Joseph H. Paden and Alexander F. MacLean to American Cyanamid Company.

Making cycloalkylacetic acid. No. 2,425,343. Earl L. Pelton and Andrew A. Holzschuh to The Dow Chemical Company.

Cellulose ether composition comprising ethyl cellulose containing at least two ethyl radicles per $C_6H_{10}O_5$ unit of cellulose and from 1 to 10% of weight of ethyl cellulose of N.N'-dibeta-naphthyl-paraphenylene diamine. No. 2,425,341. John Henry Sharphouse and John Downing to British Celanese Limited.

Aliphatic bis-dioxydiacetonitriles. No. 2,425,360. Charles F. H. Allen and James A. Van Allan to Eastman Kodak Company.

Preparation of polynitroparaffin having from 3 to 5 carbon atoms characterized by attachment of at least two nitro groups to other than primary carbon atoms. No. 2,425,367. William I. Denton, Richard B. Bishop and Edwin M. Nygaard and Thomas T. Noland to Socony-Vacuum Oil Company, Inc.

Guanidine derivatives and method of preparing. No. 2,425,376. Samuel Kushner and Louis Brancone to American Cyanamid Company.

Manufacture of vinyl type ester of formula RR'C:CH.OAc, where R and R' are selected from hydrogen and alkyl groups and Ac is an acyl group derived from a fatty acid containing at most 5 carbon atoms. No. 2,425,389. Horace Finningley Oxley and Edward Boaden Thomas and Winton Gordon Boyce Mills to British Celanese Limited.

Water-soluble salts of N.N'-di-(sulfoalkyl) - 4.4' - diaminodiphenylsulfones and preparation. No. 2,425,396. Francis Leslie Rose to Imperial Chemical Industries Limited.

Preparation of phthalic anhydride from petroleum fraction of nature of heavy naphtha. No. 2,425,398. Robert F. Ruthruff to The Sherwin-Williams Company.

Preparing isoparaffin comprises contacting ethylene with anhydrous zirconium tetrachloride at 250-570°F in presence of hydrogen chloride. No. 2,425,416. Donald C. Bond and Michael Savoy to The Pure Oil Company.

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* *U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4. Canadian from August 26 - September 30, 1947.*

Polyhalogeno aliphatic nitriles. No. 2,425,426. Robert M. Joyce, Jr., to E. I. du Pont de Nemours & Company.

2-Chloro 2-cyanobutanes containing additional chlorine radical in one of positions adjacent to 2-position. No. 2,425,432. Joy G. Lichty to Wingfoot Corporation.

Purifying pyrrole from pyridine bases, comprising adding phenol to form maximum azeotrope with all pyridine bases present fractionally distilling mass. No. 2,425,440. George Riethof to Pittsburgh Coke & Chemical Company.

Preparing dichlorsuccinic anhydride. No. 2,425,509. Albert M. Clifford and John R. Long to Wingfoot Corporation.

Preparing aryl esters of alpha-acetoxypropionic acid comprises reacting alpha-acetoxypropionyl chloride with compound selected from phenol, metallic salt of phenol, cresol and metallic salts of cresol. No. 2,425,-523. Edward M. Filachione and Charles H. Fisher.

New chemical compound, 4-$NO_2C_6H_4OCH_2CCl$ (CH_3) CH_2Cl. No. 2,425,-534. William F. Hester and W. E. Craig to Rohm & Haas Company.

Dehydrating carboxylic acid which is liquid at 25°C and contains water comprising reacting aqueous acid with hydrogen chloride and compound selected from hydrogen cyanide and water soluble organic nitrile. No. 2,425.542. Vernon K. Krieble and Robert H. Smellie.

Preparation of tertiary alkoxyacetonitrile comprises heating under pressure tertiary olefine with formaldehyde cyanhydrin in presence of acid catalyst. No. 2,425,615. William F. Gresham to E. I. du Pont de Nemours & Company.

In preparation of ethylene-urea from ethylene glycol and urea, steps comprise discharging reaction product, obtained by heating ethylene glycol and urea, urea being present in excess into water, heating resulting mixture to 200 to 300°C subsequently recovering ethyleneurea from heated mixture. No. 2,425,627. Donald J. Loder to E. I. du Pont de Nemours & Company.

In continuous process for homopolymerizing ethylene at pressure above at least 1000 atmospheres, steps comprise passing ethylene together with dialkyl dioxide of formula ROOR′ in which R and R′ are simple unsubstituted alkyl groups, containing from 1 to 3 carbon atoms into reaction zone of relatively great length to diameter, etc. No. 2,425,638. Merlin Dewey Peterson to E. I. du Pont de Nemours & Company.

In purification of amino-acetonitrile contained in crude aqueous liquid mixture, steps comprise passing crude aqueous liquid mixture under reduced pressure through tubular heating zone in not more than 3 minutes, etc. No. 2,425,661. Arthur G. Weber and Clarence D. Bell to E. I. du Pont de Nemours & Company.

Producing N-substituted beta-aminopropionitrile. No. 2,425,693. Elmer W. Cook and Philip H. Moss to American Cyanamid Company.

Preparing acrylic acid includes steps of reacting ethylene cyanohydrin with anhydrous sulfuric acid to produce beta-sulfatopropionamide, adding water thereto, heating mixture at temperature to form acrylic aid and ammonium bisulfate, recovering acrylic acid therefrom. No. 2,425,694. Harold S. Davis, Myrl Lichtenwalter and John G. Erickson to American Cyanamid Company.

Thiophene compounds and methods of obtaining same. No. 2,425,721. Frederick F. Blicke to The Regents of the University of Michigan.

Thiophene compounds and methods for obtaining same. No. 2,425,722. Frederick F. Blicke to The Regents of the University of Michigan.

Thiophene compounds and methods for obtaining same. No. 2,425,723. Frederick F. Blicke to The Regents of the University of Michigan.

Compound selected from N-dimethyl thymoxy-acetamidine, N-diethyl thymoxy-acetamidine, and salts thereof. No. 2,425,730. Carl Djerassi and Caesar R. Scholz to Ciba Pharmaceutical Products, Inc.

Continuous process for alkylation of a low-boiling isoparaffin by reaction with low-boiling olefin in presence of hydrofluoric acid catalyst. No. 2,425,745. Ancel B. Leonard and George R. Hettick to Phillips Petroleum Company.

Mixture of monohydroxy oxyethylene oxy 1,2-propylene aliphatic monoethers in which ethylene oxide and 1,2-propylene oxide are combined therein as oxyethylene and oxy 1,2-propylene groups in ratio which is at least one-third part of 1,2-propylene oxide for each part of ethylene oxide by weight. No. 2,425,755. Frederick H. Roberts and Harvey R. Fife to Carbide and Carbon Chemicals Corporation.

New product, beta, gamma unsaturated alkyl diester of aryl phosphonic acid. No. 2,425,765. Arthur Dock Fon Toy to Victor Chemical Works.

New product, beta gamma unsaturated alkyl diester of alpha, beta unsaturated alkenyl phosphonic acid. No. 2,425,766. Arthur Dock Fon Toy to Victor Chemical Works.

Improved process for producing phenolic sulfides and disulfides. No. 2,425,824. Theodore J. Peters, Jr., and James E. J. Kane to Standard Oil Development Company.

Production of major proportion of monoalkylbenzene derivatives comprises introducing under reaction conditions olefin hydrocarbon into intimate mixture of benzene and alkylation catalyst consisting of addition compound of boron fluoride with monohydric alcohol corresponding in number of carbon atoms and in molecular structure to said olefin. No. 2,425,839. Walter A. Schulze and William N. Axe to Phillips Petroleum Company.

Lower alkyl mercaptans as short stopping agents in buradiene-styrene emulsion polymerization. No. 2,425,840. Walter A. Schulze and Willie W. Crouch to Phillips Petroleum Company.

Mixtures of polyoxylalkylene diols and methods of making mixtures. No. 2,425,845. Walter J. Toussaint and Harvey R. Fife to Carbide and Carbon Chemicals Corporation.

Preparing isomers of tertiary olefins. No. 2,425,858. Leland K. Beach to Standard Oil Development Company.

Condensation of alkyl chlorides having less than four carbon atoms per molecule to produce hydrocarbons having greater number of carbon atoms than alkyl chloride treated. No. 2,425,861. Henry Trueheart Brown and Everett Gorin to Socony-Vacuum Oil Company, Incorporated.

Direct oxidation of lower aliphatic alcohol to obtain corresponding aliphatic acid. No. 2,425,878. David C. Hull to Eastman Kodak Company.

Oxidation of alcohols. No. 2,425,879. David C. Hull to Eastman Kodak Company.

Oxidation of lower aliphatic alcohols. No. 2,425,880-882. David C. Hull to Eastman Kodak Company.

Preparing 1,1-difluoroethane comprises reacting acetylene with hydrogen fluoride in liquid phase having dissolved therein at least 1.0% by weight of hydrogen fluoride of boron trifluoride under anhydrous conditions at temperature of −20°C to 65°C and pressure less than 200 lbs. p.s.i. No. 2,425,991. Robert E. Burk, Donald D. Coffman and George H. Kalb to E. I. du Pont de Nemours & Company.

Glucose bisulfite compounds of alkoxy amino pyridine. No. 2,426,011. Harris L. Friedman and Leo D. Braitberg to Pyridium Corporation.

Glucosidamino compounds of alkoxy pyridine. No. 2,426,012. Harris L. Friedman and Leo D. Braitberg to Pyridium Corporation.

Manufacture of acyl cyanides containing from 2 to 10 carbon atoms per molecule comprises reacting hydrogen cyanide with carboxylic acid anhydride in vapor phase in presence of solid contact absorptive catalyst, separating acyl cyanide from reaction product. No. 2.426,014. William F. Gresham to E. I. du Pont de Nemours & Company.

Synthesis of 3-methyl-3-methoxybutanol-1. No. 2,426,015. William E. Grigsby to E. I. du Pont de Nemours & Company.

Preparing 1,3-butylene glycol comprises heating aqueous formaldehyde, containing 3 to 10 moles of water per mole of formaldehyde, in presence of sulfuric acid in quantity equal to 0.5 to 15% of amount of water initially present, etc. No. 2,426,017. Clement H. Hamblet and Ambrose McAlevy to E. I. du Pont de Nemours & Company.

Ester of cyanoacetic acid and polyhydric alcohol R(OH)n. No. 2,426,056. John B. Rust to Montclair Research Corporation.

Production of chlorinated aliphatic nitriles. No. 2,426,091. James John Gray and Frank Burgess to Imperial Chemical Industries Limited.

Preparing organo silicon derivative comprises adding mixture of halohydrocarbon and silicon halide to mixture of magnesium and Grignard solvent at temperature at which refluxing takes place. No. 2,426,121. John B. Rust and Charles A. MacKenzie to Montclair Research Corporation.

Preparing organo silicon derivative comprises adding halohydrocarbon to heated mixture of silicon halide, magnesium and Grignard solvent of alkyl ether having not more than four carbon atoms at 30-200°C at which refluxing of ether takes place. No. 2,426,122. John B. Rust and Charles A. MacKenzie to Montclair Research Corporation.

Solid addition product of alginic acid and alkylene oxide containing not more than five carbon atoms. No. 2,426,125. Arnold B. Steiner to Kelco Company.

Inhibiting deterioration of normally unstable furfural comprising incorporating in furfural small proportion of hydrosulfite. No. 2,426,143. Rock L. Comstock and Howard F. Reeves, Jr., to Bay Chemical Company, Inc.

Canadian

A 1,3,5-triazine compound, in which one carbon atom of the triazine ring carries anilino-radical substituted by the radical—As=Cl₂. No. 444,392. Ernst A. H. Friedheim.

p-(2,4-diamino-triazonyl-(6)-[4-oxy-3-amino-phenyldichlorarsin-1]. No. 444,393. Ernest A. H. Friedheim.

Process for producing an oil-soluble acetone peroxide containing mixture. No. 444,457. Shell Development Company (Harco Jacob Tadema).

Process for recovering substantially pure methyl isobutyl ketone from mixtures thereof with mesityl oxide. No. 444,458. Shell Development Company (William A. Bailey, Jr., and Sumner H. McAllister).

Dialkyl cyclobutane. No. 444,520. Dominion Rubber Company, Ltd. (Philip Timothy Paul).

Process of preparing thiazyl sulphur halides. No. 444,521. Dominion Rubber Company, Ltd. (William Henry Ebelke).

Pyrimidine derivatives selected from the class consisting of the sulphuric acid conversion products of an alkyl-substituted 2-mercapto dihydropyrimidine and their salts. No. 444,522. Dominion Rubber Company, Ltd. (Charles Harmer Stiteler).

A compound having the formula R-O-X where R is an arylene-thiazyl sulphide group, O is oxygen, and X represents an alkyl, aryl or an R group. No. 444,523. Dominion Rubber Company, Ltd. (William Earl Messer).

A metal derivative of an amino methylene aldehyde. No. 444,557. Shell Development Company (Adrianus Johannes van Peski, Nicolaas Max and Johannes Andreas van Melsen).

Packaging

Heat-sealing thermoplastic sheeting. No. 2,424,558. William R. P. Delano to American Viscose Corporation.

Composite packing made of artificial plastic composition. No. 2,424,567. Ralph M. Hill to Armstrong Cork Company.

Receptacle of vitreous material for holding hot liquids, provided with electro-deposited protective coating; absence of copper in covering on handle causing handle to remain cool. No. 2,424,583. Erik T. Rahm.

Leak-proof container for liquid hydrocarbons comprising liner embodying material capable of self-sealing after puncture by projectile and shell enclosing liner composed of rigid and elastic sheet of mixture of rubber and cyclized rubber. No. 2,424,701. James A. Merrill to Wingfoot Corporation.

Metallic container with liner resistant to corrosive action of 73% caustic at 275°F. No. 2,424,813. Paul J. Gegner to Pittsburgh Plate Glass Company.

Leakproof stopper to be used in container. No. 2,424,930. Jack J. A. Jackson.

Apparatus for top-sealing cartons having thermoplastic sealing compound on top closure flaps. No. 2,425,067. Roy E. Lowey and John L. Ferguson to Container Corporation of America.

Paints, Pigments

Finely divided titanium dioxide which has been calcined at least 1350°C treated with vapors of methyl silicon chloride mixture and heated at 60° to 100°C. No. 2,424,853. Moyer M. Safford to General Electric Company.

Clear aqueous shellac varnish capable of yielding permanently flexible, water-resistant films on air-drying, comprising one equivalent of shellac, less than one equivalent of volatile or volatilizable alkali, mixture of aliphatic alcohols, one boiling above 100 deg. C., second alcohol boiling below 100 deg. C. and water-insoluble but alcohol-soluble plasticizer, and water. No. 2,425.023. Henry Hall Bassford, Jr., to U. S. Shellac Importers Association, Inc.

Pigment composition comprising intimate mixture of titanium dioxide and calcium-starch-metaborate. No. 2,425,058. William L. Craig to R. T. Vanderbilt Company, Inc.

Modifying non-hydroxylated, non-ketone type of drying oil having nonconjugated double bonds to improve oil as to at least one of characteristics of drying speed and heat bodying speed. No. 2,425,200. Floyd G. Nessler and Charles E. Penoyer to The Sherwin-Williams Company.

Making varnishes from polyhydric alcohol mixed esters of beta-furylacrylic acid and acidic natural resin. No. 2,425,756. Henry S. Rothrock to E. I. du Pont de Nemours & Company.

Lead resinate of heat-treated rosin having lead content from 26% to 40%. No. 2,425,926. Herschel A. Elliott to Hercules Powder Company.

Composition material comprising black copper oxide, white titanium oxide and at least two oxides taken from iron oxide, cobalt oxide, nickel oxide and chromium oxide, sume of copper oxide and titanium oxide being less than remainder of composition. No. 2,425,954. Daniel Rosenthal.

Paper, Pulp

In pulp beater and selector, pulp discharge screen forming part of tank

* *U. S. Patents from Vol. 600, Nos. 1, 2, 3, 4. Canadian from August 26 - September 30, 1947.*

wall, rotary shaft perpendicular to screen disposed centrally thereof, impeller secured to shaft in spaced opposed relation with inner side of screen, etc. No. 2,424,726. Harold Donald Wells.

Purification of cellulosic material in form of pulp in water suspension. No. 2,424,797. Ferri Casciani to Niagara Alkali Company.

Producing pulp from cellulosic material. No. 2,425,024. James Brookes Beveridge, Richard Dunlap Kehoe and Alphonse Surino to Paper and Industrial Appliances, Inc.

Coating paper webs in continuous paper making process. No. 2,425,231. Gilbert K. Dickerman and Robert W. Riley to Consolidated Water Power & Paper Company.

Apparatus for treating of lignocellulose material in fragmentary form by subjecting same to action of pulping fluid while under pressure. No. 2,425,335. Hjalmar S. Messing and Clarence L. Durkee.

Making paper covered veneer steps which comprise forming continuous ribbon of undried veneer wood, wetting continuous web of paper with water, stretching wet paper, coating one face of wet paper with adhesive, etc. No. 2,425,660. Richard N. Ware, Jr., and Reginald Cannon to Chicago Mill and Lumber Company.

Canadian

Process for making low molecular weight distillable organic compounds from lignin. No. 444,537. Marathon Corporation (Jorgen Richter Salvesen, Ralph L. Hossfeld and Robert J. Lovin).

Process which comprises incorporating in paper less than 0.1 per cent of a (non-primary amino)-aroylamino-stilbene sulphonic acid which is free from colour producing groups to impart a whitening effect to the paper. No. 444,647. Lever Brothers & Unilever, Ltd. (Richard Thomas).

In the manufacture of pulp from fibrous ligno-cellulose materials, the step which comprises treating the ligno-cellulose with sodium aluminate as an active pulping agent. No. 444,664. The Ontario Paper Company, Ltd. (John Henry Fisher and Bruce Ronald Mead).

Petroleum

Lubricant comprising liquid petroleum hydrocarbon fraction containing linear polyester condensation product of dimer of unsaturated vegetable oil fatty acid with glycol. No. 2,424,588. William J. Sparks and David W. Young to Standard Oil Development Company.

Producing oxidized hydrocarbon waxes from crude oil containing wax bearing substances, light oils asphaltic ingredients and oxidation inhibiting constituents. No. 2,424,671. Ernest Stossel.

Producing end product mixture of chemical compound having pronounced emulsifying, dispersing and wetting properties consists in sulfonating cycloaliphatic hydrocarbon by use of excess of concentrated sulfuric acid over amount called for by reaction equation, etc. No. 2,424,951. Alfred R. Globus.

Subjecting paraffinic hydrocarbon having five to seven carbon atoms inclusive to isomerization reaction. No. 2,424,953. Claude G. Myers and Rowland C. Hansford and Alexander N. Sachanen to Socony-Vacuum Oil Company, Ind.

Preparing synthetic lubricant of low pour point and susceptible of substantial pour point lowering from crystalline paraffin wax having melting point not greater than 140°F. and xylene. No. 2,424,956. Orland M. Reiff, Howard D. Hartough, and Harry J. Andress, Jr., to Socony-Vacuum Oil Company, Inc.

Oil purifying substances comprising 35% to 55% by weight of oil-soluble tertiary organic amine, 5% to 25% of oil-soluble sulfonic acid salt, 30% to 50% of neutral predominantly hydrocarbon mixture extracted from petroleum with furfural. No. 2,425,085. Harold F. Dague.

Cracking hydrocarbon oils comprises heating said oil to cracking temperatures, contacting it with catalyst consisting of titania gel containing boria. No. 2,425,087. Joseph D. Danforth to Universal Oil Products Company.

Lubricant for use in cold rolling of steel. No. 2,425,174. Emmett S. Carmichael and Theodore G. Roehner to Socony-Vacuum Oil Company, Inc.

Breaking petroleum emulsions of water-in-oil type, comprises subjecting emulsion to action of aminated chlorinated paraffin characterized by nitrogen content of 1% to 11% and chlorine content of 2% to 20%. No. 2,425,175. Paul G. Carpenter to Hercules Powder Company.

Removing from wall of earth bore filter cake deposited from basic dye, positively charged, colloid, drilling mud, etc. No. 2,425,456. Donald C. Bond to The Pure Oil Company.

Alkylating hydrocarbons. No. 2,425,462. Leslie U. Franklin to Gulf Oil Corporation.

Catalytically converting hydrocarbon oil into gasoline hydrocarbons. No. 2,425,463. Allen D. Garrison to Texaco Development Corporation.

In catalytic cracking of hydrocarbon feed oil higher boiling than gasoline by contact at elevated temperatures with silica alumina cracking catalyst which is periodically reactivated to remove carbonaceous material by combustion steps comprise treating reactivated catalyst prior to contact with feed oil by contact with normally gaseous hydrocarbon, etc. No. 2,425,482. Charles E. Moser to The Texas Company.

Continuous method of polymerizing unsaturated hydrocarbons comprising C_4 and lighter olefins by contact with catalyst at elevated temperature. No. 2,425,493. Victor Stapleton to The Texas Company.

Production of oil from single bore hole traversing at least two productive horizons and in which leakage of oil from horizon of higher pressure to one of lower pressure is apt to occur. No. 2,425,531. Nathaniel G. Haseltine and Morris Bock to Sun Oil Company.

Removing inorganic impurities from mineral oils preparatory to catalytic cracking. No. 2,425,532. Charles E. Hemminger to Standard Oil Development Company.

Separating normal paraffins from branched chained paraffins in mixture of paraffins containing from 6 to 10 carbon atoms per molecule. No. 2,425,535. Henry J. Hibshman to Standard Oil Development Company.

Improving motor fuel value of mixture of polyalkylated aromatic hydrocarbons. No. 2,425,559. Herbert J. Passino and Henry G. McGrath to The M. W. Kellogg Company.

Alkylating isoparaffins with olefins using concentrated sulfuric acid catalyst, improvement comprises maintaining in sulfuric acid catalyst minor amount of chlorosulfonic acid to promote reaction. No. 2,425,572. Ober C. Slotterbeck to Standard Oil Development Company.

Lubricating composition comprising major proportion of lubricating oil base stock and small amount of condensation product of aliphatic monohydroxy alcohol having less than 7 carbon atoms and aromatic compound having less than 4 aromatic nuclei. No. 2,425,747. Eugene Lieber and Marvin E. Thorner to Standard Oil Development Company.

Extracting weakly acidic substances from hydrocarbon distillates comprises contacting distillates with solution of alkali metal hydroxide and solutizer comprising alkali metal salt of thioether acid. No. 2,425,776. Chester E. Adams and Theodore B. Tom to Standard Oil Company.

Extracting weakly acidic substances from hydrocarbon distillates comprises contacting distillates with solution of alkali metal hydroxide and solutizer comprising alkali metal salt of polyether acid. No. 2,425,777. Chester E. Adams and Theodore B. Tom to Standard Oil Company.

Improved electrical insulating oil consisting of highly refined mineral oil suitable for use as insulating medium in electrical equipment which has been stabilized against deleterious action of micro-organisms therein by incorporation in oil of 0.05 to 0.2% by weight of naphthoquinone. No. 2,425,791. Edward S. Flynn to Anaconda Wire & Cable Company.

Producing motor fuel of improved antiknock characteristics. No. 2,425,960. Walter A. Schulze to Phillips Petroleum Company.

Catalytic dehydrogenation of hydrocarbons. No. 2,426,118. Robert L. Parker, Jr., and Hal C. Huffman to Union Oil Company.

Photographic

Rapidly fixing photographic element includes non-gelatin layer selected from cellulose esters and synthetic resins of limited permeability to water containing developed silver image. No. 2,425,363. John I. Crabtree and George T. Eaton to Eastman Kodak Company.

Photographic silver halide emulsion containing color former fast to diffusion. No. 2,425,503. Abraham Bavley to General Aniline & Film Corporation.

Canadian

A light sensitive layer comprising a diazo-N-sulphonate derivative of a p-phenylene diamine, an azo component, an alkali metal bisulphite and acetone. No. 444,527. General Aniline and Film Corporation (William H. von Glahn and Maximilian K. Reichel).

Polymers

Preparing heat-convertible molding composition in form of coagulated plastic product capable of being directly molded under heat and pressure, from heat-convertible one-stage phenol-formaldehyde resinous product, etc. No. 2,424,787. William H. Adams, Jr., to Haveg Corporation.

Preparing hard, plasticized styrene-maleic anhydride body, comprises mixture of 25 parts maleic anhydride, 30 parts styrene together with about 30 parts methyl levulinate, acetophenone, diacetone alcohol or mesityl oxide, etc. No. 2,424,814. Howard L. Gerhart to Pittsburgh Plate Glass Company.

Artificial resin comprising conjoint polymer of mixture monocarboxylic acid ester of allyl alcohol structural formula described in patent and vinyl ester having formula described in patent. No. 2,424,838. Eugene W. Moffett and Roy E. Smith to Pittsburgh Plate Glass Company.

Paraformaldehyde modified reaction products of diisocyanates with linear polyester polyamide. No. 2,424,883. Bernard James Habgood, David Augustine Harper and Reginald John William Reynolds to Imperial Chemical Industries, Limited.

Sulfur vulcanization of unsaturated reaction products of diisocyanate with linear polyesters and linear polyester-amides from products resulting therefrom. No. 2,424,884. James Gordon Cook, David Augustine Harper, Reginald John William Reynolds and Walter Fairbairn Smith to Imperial Chemical Industries, Limited.

Paraformaldehyde treatment of reaction products of diisocyanate with linear polyesters and linear polyester-amides and products resulting therefrom. No. 2,424,885. Jack Mitchell Buist, David Augustine Harper, Walter Fairbairn Smith and George Neale Welding to Imperial Chemical Industries, Limited.

Polymerizing rosin comprises treating rosin in liquid phase with small amount to 10% of catalytic material selected from mercury chlorides and mercury bromides. No. 2,424,979. Burt L. Hampton to The Glidden Company.

Preparing molecularly oriented copolymers of acrylonitrile, butadiene 1,3 and a vinyl ether. No. 2,425,086. Gaetano F. D'Alelio to Pro-phylac-tic Brush Company.

Polymerizing alkyl ester of acrylic acid in which alkyl group contains from 1 to 4 carbon atoms in an at least 65% solution of zinc chloride in water. No. 2,425,191. Edward L. Kropa to American Cyanamid Company.

Polymerizing vinyl acetate in an at least 65% solution of zinc chloride in water. No. 2,425,192. Edward L. Kropa to American Cyanamid Company.

Modifying properties of synthetic linear polyamide articles in form of filaments, bristles, yarn or the like which have not been cold drawn to render article incapable of being cold drawn by more than about 75% of their original length comprising impregnating shaped undrawn polyamide article with aqueous solution having pH of not greater than 3.0 and having dissolved therein at least 20% by weight of formaldehyde, catalyst selected from acids having ionization constant of at least 1.0×10^{-3} at 25°C and the water soluble ammonium, amine and metallic salts of such acids, etc. No. 2,425,334. David McCreath to Imperial Chemical Industries, Limited.

Preventing crazing of flash heated shape of polystyrene comprises heating shape at 194-221°F immediately flash heating shape by drawing it through die heated to 580-600°F immediately quenching shape. No. 2,425,501. Fred E. Wiley to Plax Corporation.

In production of shaped articles by polymerization in rigid mold, of polymerizable organic compounds which form hard resin on polymerization, method of maintaining volume of material being polymerized constant during polymerization. No. 2,425,666. Carl E. Barnes to General Aniline & Film Corporation.

Manufacture of chlorinated polyvinyl chloride comprising adding water and polyvinyl chloride to organic solvent therefor to form solution of polyvinyl chloride containing between 0.12% and 1.0% by weight of water, passing chlorine into solution at 80°C to 120°C. No. 2,426,080. James Chapman and John William Croom Crawford to Imperial Chemical Industries, Limited.

Producing hard electrically insulating articles from polyisobutylene, styrene and divinyl benzene. No. 2,426,111. Willi Mertens.

Canadian

Composition comprising a polymerizable, acid-curing, thermosetting resin and endomethylene tetrahydrophthalic anhydride. No. 444,502. American Cyanamid Company (Washington Hull).

Processes and Methods

Dissolving bubbles in bubble-containing liquid metering liquid in its bubble-free state. No. 2,424,751. Winfield Walter Heckert to E. I. du Pont de Nemours & Company.

Purifying natural, vegetable oils, for simultaneously removing hydrophilic and waxy components. No. 2,425,001. Fremont P. Parkin and George N. Walker to Minnesota Linseed Oil Paint Company.

Additional patents from the above volumes will be given next month.

Trademark of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

432,004. Hood Chemical Co., Inc., New York, N. Y., filed Feb. 4, 1946; for rinsing aid; since Jan. 4, 1946.

432,018. Diana Krutman as Moth Gard Products Company, New York, N. Y., filed May 7, 1946; Serial No. 501,578; for moth and insect preventative preparations; since 1937.

489,935. Bee Chemical Company, Chicago, Ill., filed Oct. 15, 1945; for chemical compositions for use in grinding of metals; since September 1945.

497,975. Harry Shapiro, as Chemical Specialties Company, New York, N. Y., filed Mar. 9, 1946; for disinfectant; since May 1934.

499,411. Hillyard Chemical Company, St. Joseph, Mo., filed Apr. 1, 1946; for liquid surgical soap; since March 1945.

503,673. Reilly-Whiteman-Walton Company, Conshohocken, Pa., filed June 11, 1946; for fatty oils; since Nov. 16, 1945.

504,140. West Virginia Pulp and Paper Company, New York, N. Y., filed June 18, 1946; for precipitated calcium carbonate; since May 16, 1946.

506,463. Henry O. Mattos, as Michael's Hiar Products Co., Brooklyn, N. Y.; filed July 29, 1946; for liquid soap preparation; since Apr. 6, 1946.

507,879. Gerald M. Baxter as The Remagin Company, Baltimore, Md., filed Aug. 23, 1946; for chemical spot removing compound; since Nov. 21, 1945.

508,030. Chemi-Troll Products, Gibsonburg, Ohio, filed Aug. 26, 1946; for insecticides, fungicides, herbicides; since Jan. 15, 1946.

508,809. Onyx Oil & Chemical Company, Jersey City, N. J., filed Sept. 10, 1946; for synthetic detergent; since Aug. 7, 1946.

508,922. Herbert W. E. Riley, as Polyplastex, Elmhurst, N. Y., filed Sept. 12, 1946; for fabric sheets of glass fibre webs or mats impregnated with resinous plastic substances; since about Apr. 4, 1946.

508,925. Herbert W. E. Riley as Polyplastex, Elmhurst, N. Y., filed Sept. 12, 1946; for fabric sheets of glass fibre webs or mats impregnated with resinous plastic substances; since about Apr. 10, 1946.

509,427. Kamen Soap Products Co., Inc., New York, N. Y.; filed Sept. 20, 1946; for soap powder, soap flakes, synthetic paste and powder detergents; since Sept. 1, 1946.

509,862. The Minnesota Chemical Company, St. Paul, Minn., filed Sept. 27, 1946; for dairy cleaners; since Sept. 9, 1946.

509,863. The Minnesota Chemical Company, St. Paul, Minn., filed Sept. 27, 1946; for soap; since Apr. 1, 1946.

509,942. Maurice King as King Products Company, Brooklyn, N. Y.; filed Sept. 28, 1946; for chemical detergents and soaps; since July 1946.

509,998. J. O. Safford as The Safford Company, Tryon, N. C., filed Sept. 30, 1946; for washing compounds; since August 1945.

510,101. The Morton S. Pine Co., Cleveland, Ohio, filed Oct. 2, 1946; for cleaning preparation having water-softening qualities; since Nov. 20, 1945.

510,131. Tex Products, Inc., Newark, N. J., filed Oct. 2, 1946; for cleaning and polishing preparation; since July 12, 1946.

510,212. Standard Alcohol Company, New York, N. Y., filed Oct. 3, 1946; for isopropyl alcohol; since Dec. 22, 1919.

510,862. Shell Chemical Corporation, San Francisco, Calif., filed Oct. 14, 1946; for chemical corrosion inhibitor; since Dec. 19, 1945.

511,116. The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., filed Oct. 18, 1946; for dielectric material and supplies; since February 1941.

511,654. The Texas Company, New York, N. Y., filed Oct. 28, 1946; for lubricating grease; since Oct. 7, 1946.

511,724. The Buromin Company, Pittsburgh, Pa., filed Oct. 30, 1946; for chemical compound to prevent formation of boiler scale; since Sept. 20, 1944.

511,840. Thompson-Hayward Chemical Company, Kansas City, Mo., filed Oct. 31, 1946; for rodenticide; since Sept. 19, 1946.

512,251. Georgia Kaolin Company, Elizabeth, N. J., filed Nov. 8, 1946; for clay used in plastic molding powders; since Sept. 2, 1946.

512,491. The Eastern Light Company, Allentown, Pa., filed Nov. 13, 1946; for propane bottled gas; since July 1, 1946.

513,536. Royce Chemical Company, Carlton Hill, N. J., filed Nov. 30, 1946; for wetting out agent; since Oct. 24, 1946.

513,673. Monsanto Chemical Company, St. Louis, Mo., filed Dec. 4, 1946; for curling agent for wool fibers; since Oct. 10, 1946.

513,675. Monsanto Chemical Company, St. Louis, Mo., filed Dec. 4, 1946; for synthetic resins; since Oct. 24, 1946.

514,214. Monsanto Chemical Company, St. Louis, Mo., filed Dec. 13, 1946; for combating insects, mites and other plant pests; since Nov. 26, 1946.

514,528. The Diversey Corporation, Chicago, Ill., filed Dec. 19, 1946; for insecticide; since Nov. 26, 1946.

514,595. E. I. Du Pont de Nemours & Company, Wilmington, Del., filed Dec. 20, 1946; for agricultural fungicide; since Oct. 23, 1945.

515,155. Buckman Laboratories, Inc., Memphis, Tenn., filed Jan. 2, 1945; for general preservatives, pulp, paper and tanning industries; since Nov. 1, 1945.

515,156. Buckman Laboratories, Inc., Memphis, Tenn., filed Jan. 2, 1947; for general preservatives, for pulp, paper and tanning industries; since Nov. 1, 1945.

515,260. E. I. Du Pont de Nemours & Company, Wilmington, Delaware., filed Jan. 4, 1945; for chemical compound, consisting of an eutectic mixture of nitrates and nitrites of sodium and potassium; since Nov. 25, 1946.

515,530. Bee Chemical Company, Chicago, Ill., filed Jan. 10, 1947; for corrosion preventive compositions; since June 1946.

515,655. California Spray-Chemical Corporation, Wilmington, Del., and Richmond, Calif., filed Jan. 13, 1945; for parasiticides; since Nov. 27, 1946 .

515,898. Onyx Oil & Chemical Company, Jersey City, N. J., filed Jan. 17, 1947; for wetting and emulsifying agent; since March 1940.

517,225. American Cyanamid Company, New York, N. Y., filed Feb. 10, 1947; for benzene hexachloride insecticide; since Dec. 26, 1946.

518,279. Dexter Chemical Corporation, New York, N. Y.; filed Feb. 28, 1947; for wetting agents; since January 1946.

518,856. Sun Oil Company, Philadelphia, Pa., filed Mar. 11, 1947; for plasticizer for rubber; since Jan. 24, 1947.

519,483. Monsanto Chemical Company, St. Louis, Mo., filed Mar. 24, 1947; for agricultural insecticides, fungicides, herbicides; since Feb. 7, 1947.

519,790. Woolfolk Chemical Works, Ltd., Fort Valley, Ga., filed Mar. 28, 1947; for insecticides; since October 1946.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, July 9 - August 18.

CHEMICAL INDUSTRIES INFORMATION SERVICE

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Key Numbers		Page Numbers
1.	Abril Corporation	946
2.	Adam Chemical Co., Inc.	1054
2.	Albrecht Chemical Co., Inc.	1075
4.	Allied Asphalt & Mineral Corp.	1063
5.	Alrose Chemical Co.	1078
6	American Can Co.	1043
7.	American Cyanamid Co.	939
8.	American Potash & Chemical Corp.	1062
9.	Ansul Chemical Co.	1008
10.	Arnold, Hoffman & Co., Inc.	1081
11.	Armour & Co.	938
12.	Aromatics Division, General Drug Co.	1088
13.	Bagpak, Inc.	1031
14.	Baker Castor Oil Co., The	1013
15.	J. T. Baker Chemical Co.	933, 1017
16.	Baker Instrument Co.	1052
17.	Baker & Adamson Co., Division of General Chemical Co.	965
18.	Barrett Division, The, Allied Chemical & Dye Corp.	1064
19.	Beacon Co., The	1057
20.	Bemis Brothers Bag Co.	1041
21.	Bjorksten Laboratories	1087
22.	Bonded Scale Co. Mfrs.	1083
23.	Bower Mfg. Co., Henry	1067
24.	Brill Equipment Co.	1086
25.	Buckeye Cooperage Co.	1086
26.	Burke, Edw. S.	1080
27.	R. P. Cargille	1068
28.	Carbide & Carbon Chemical Corp.	1007
29.	Cargille Scientific Co.	1068
30.	Cargille Scientific Co.	1068
31.	Celanese Corp. of America	959
32.	Chemical Construction Corp.	1035
33.	Chemical & Process Machinery Corp.	1086
34.	Chemical Service Corp.	1087
35.	C. P. Chemical Solvents, Inc.	1082
36.	Chemicolloid Labs., Inc.	1022
37.	Chemische Fabrik Schweizerhall	1074
38.	Chikaan Co.	1028
39.	Church & Dwight Co., Inc.	1055
40.	Claflin, Alan A.	1082
41.	Colorado Asbestos & Mining Co.	1085
42.	Commercial Plastics Co.	1018
43.	Commercial Solvents Corp.	972
44.	Consolidated Chemical Industries	1063
45.	Consolidated Products Co., Inc.	1085
46.	Cook Electric Co.	1034
47.	Cowles Detergent Co., The	1061
48.	Corps of Engineers, U. S. Army	1032
49.	Copywright Carbon Co.	1084
50.	Crosby Chemicals, Inc.	1075
51.	Croton Chemical Corp.	1073
52.	Davison Chemical Corp.	960
53.	Dear, R. B.	1082
54.	Diamond Alkali Co.	961, 1009
55.	Diehl & Co., Wm.	1046
56.	Distributing & Trading Corp.	1044
57.	Doe & Ingalls, Inc.	1082
58.	Drew Co., Inc., E. F.	1019
59	Dunkel & Co., Paul A.	1067
60.	Eastman Kodak Co.	1051
61.	Eaton Clark Company	1057
62.	Edwards Mfg. Co., The	1077
63.	Emaco Equipment Co.	1086
64.	English Mica Co., The	1069
65.	Equipment Finders Bureau	1087
66.	Evans Assoc., Ralph L.	1087
67.	Evans Research & Development Corp.	1087
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157. Sargent & Co., E. H.	1050
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159. Sharples Chemicals, Inc.	Insert between pages 948 & 949
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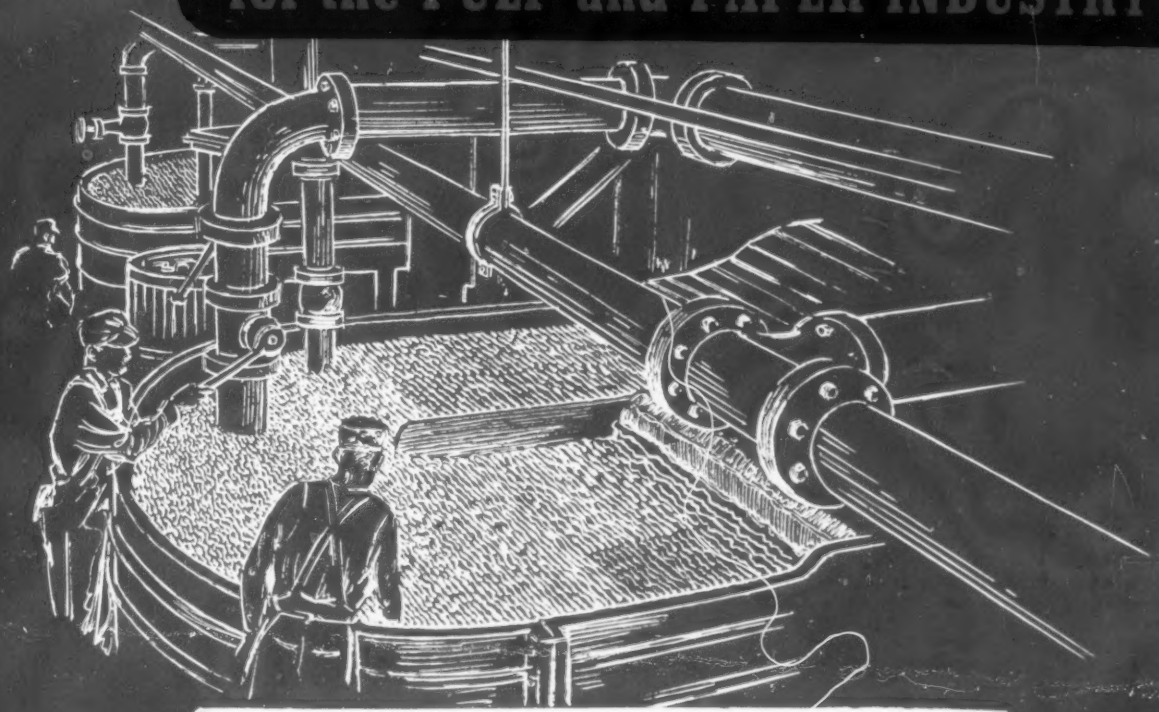

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